

Pediatric Cases Tuberculosis Webinar

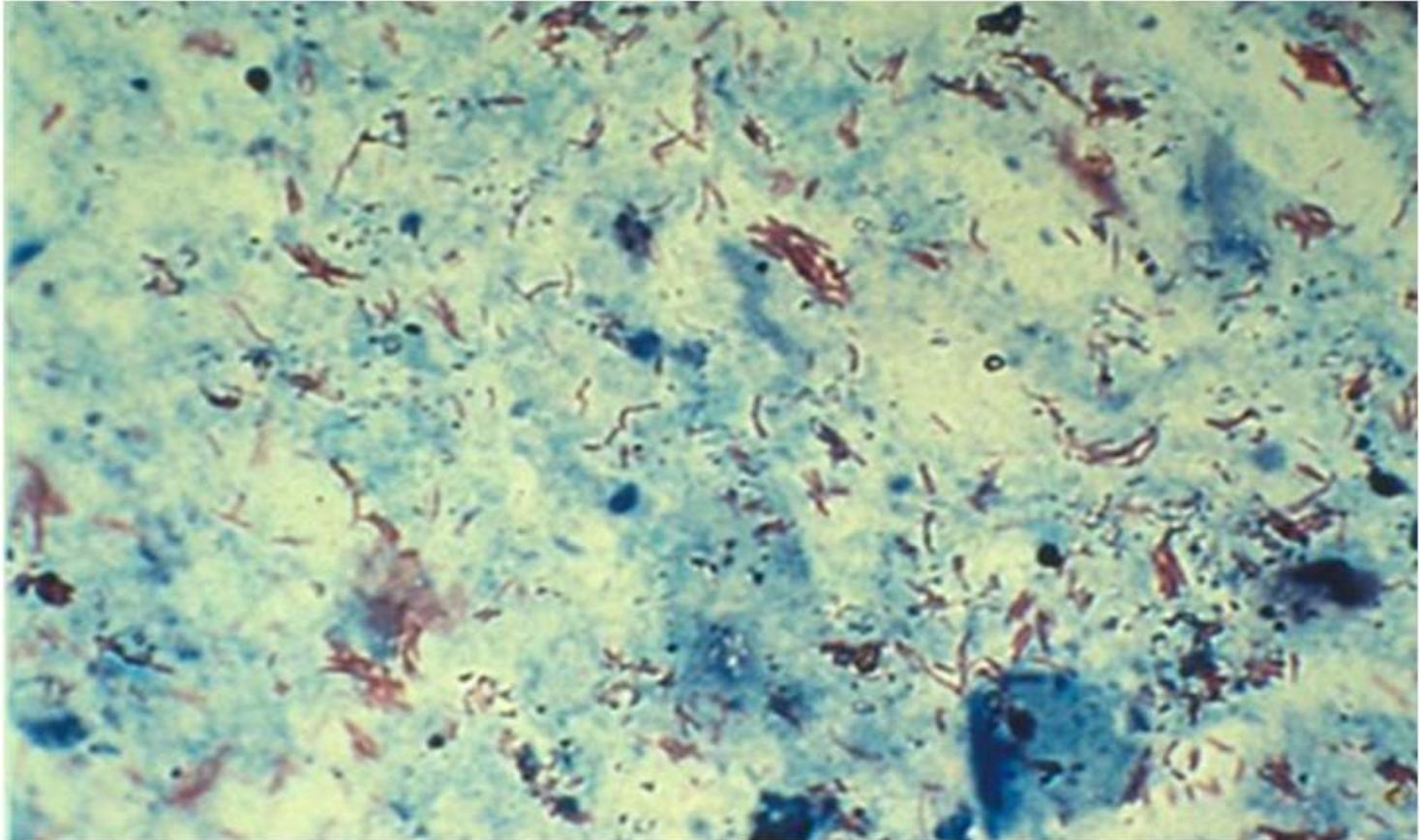
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Children's Hospitals of Minnesota

Wednesday June 22 ,2016

AFB Smear

AFB (shown in red) are tubercle bacilli



CDC 2011

Objectives

Case presentations illustrating

1. CNS tuberculosis symptoms and diagnosis
2. Extra Pulmonary Tuberculosis as a FUO(fever without focus)
3. Pediatric Cases of MDR Tb
4. LTBI case report

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Extrapulmonary TB

- 15 yr old Born in Ethiopia, moved back & forth between Ethiopia and Refugee camp in Kenya
- Mother passed away ,adopted by maternal grandmother
- Moved to MN arrived in USA from Nairobi 12/2013
- CXR normal, PPD ? Positive in HAP clinic at HCMC, Immunisations done
- Seen in ED x2 and PMD x1 for the following symptoms that have been recurring for 3-4 years
- Seen in Infectious disease 6 weeks after arrival

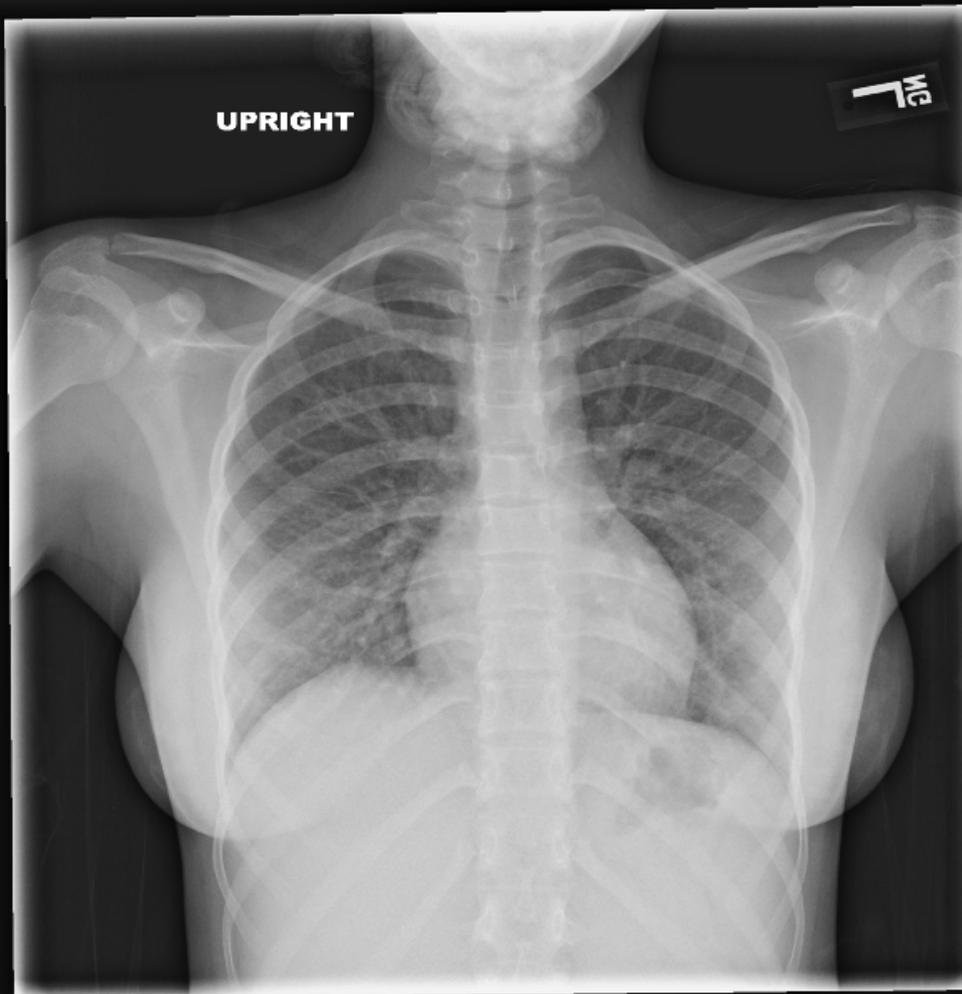
Symptoms

- Intermittent Fevers, chills, headache bodyaches, arthralgias, missing school. AM stiffness, poor appetite, tired poor sleep with 5 lb documented weight loss
- H/o Recurring lumps in skin over lower extremities, painful, tender, difficult to walk, some on plantar aspect some on wrist
- H/o Rx with Clindamycin for impetigo lesions a week ago which resolved. No family h/o MRSA or *ABSSSI
- But painful lumps and systemic symptoms no change
- Also wrist and ankle bilateral swelling and tenderness

****Acute bacterial skin and soft tissue infection***

Erythema nodosum





LAB RESULTS

ABNORMAL

- **Sodium 133 mEq/L (L)** (Ref. Range 137 - 147)
- **Albumin 2.7 g/dL (L)** (Ref. Range 3.5 - 4.9)
- **Protein- Total 9.4 g/dL**
- **HEMOGLOBIN 9.8 g/dL (L)** (Ref. Range 12.0)
- **MCV 76 fL (L)**
- **Antistreptolysin O Titer 1,030 IU/mL (H)** (Ref. Range 0 - 199)
- **Anti-Dnase B Titer 1,870 U/mL (H)** (Ref. Range 0 - 375)
- **IgG 2,600 mg/dL (H)** (Ref. Range 734 - 1,570)
- **IGE 1300IU/ml**
- **Sedimentation Rate 102 mm/hr (H)** (Ref. Range 0 - 20)
- **Quantiferon Positive TB Antigen Value 10.18 IU/mL &**

NORMAL

- **Rapid Malaria Presumptive negative &**
- **Hepatitis A Aby- IgM Negative &**
- **Hepatitis B Core Aby- IgM Negative &**
- **Hepatitis B Surface Agn Negative &**
- **Hepatitis C Virus Aby Negative &**
- **HSV IgM, IFA Negative**
- **HSV1 IgG Positive &**
- **HSV2 IgG Negative &**
- **HSV Screen, IgM, EIA Reactive &**
- **HIV-1,2 Aby Eval Negative**
- **Chlamydia titers negative**
- **FANA Screen Negative &**
- **Rheumatoid Factor- Quant <10 IU/mL** (Ref. Range 7:52)

Children's Hosp Mpls
ABDULLAHI NAJMA AHMED
2549751
01-Jan-1999
female

[A]

CT Abdomen + Pelvis w/ Contrast
13-Feb-2014 13:40:07
BELANI, KIRAN K
Operator: mk



[R]



120.0 kVp
ST: 5.000 mm
tilt: 0°
512x512
W/L: 351/60

CT
Img 19



CT SCAN ABDOMEN

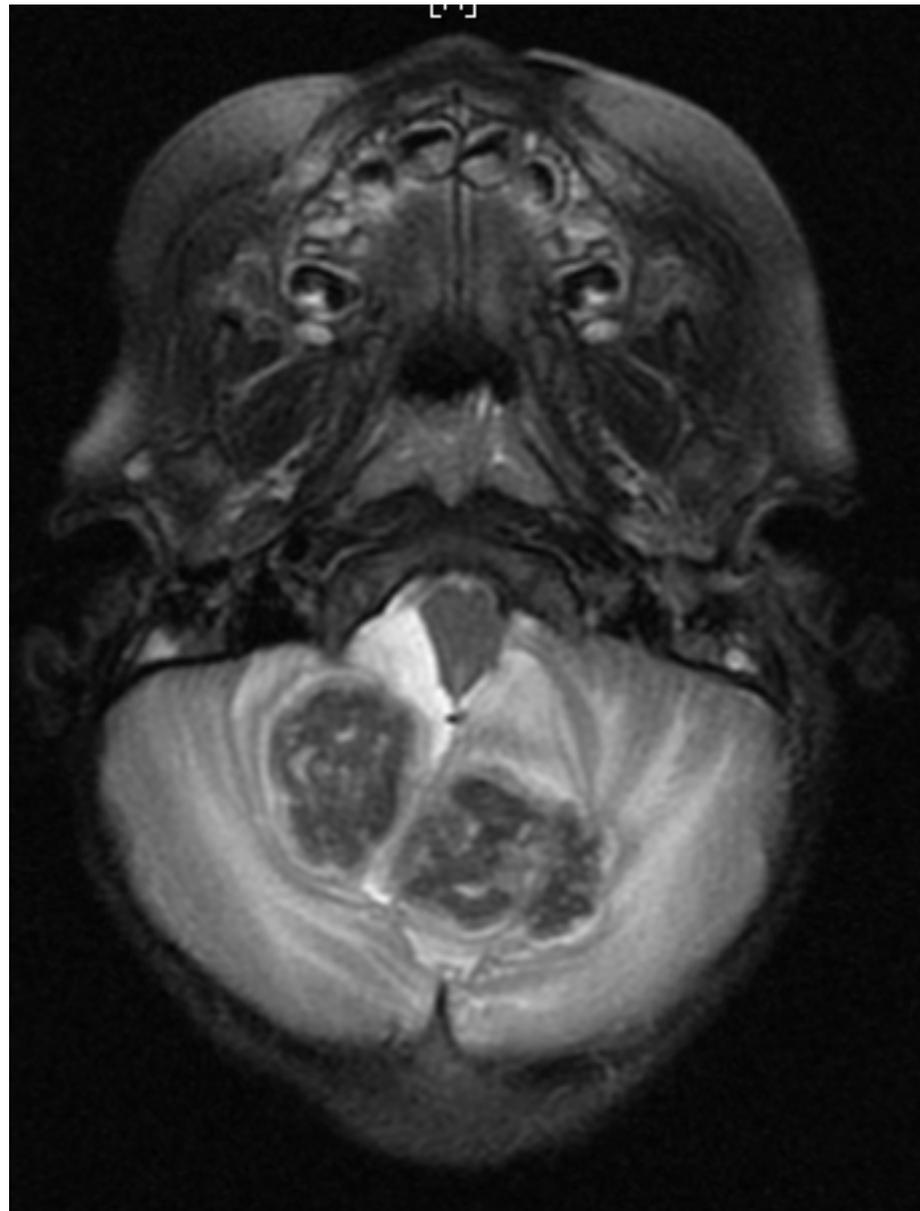
- ***low-attenuation lesions throughout all segments of the liver. These lesions measure higher in attenuation than simple fluid and range in size from several millimeters to approximately 3.5 cm.***
- ***Multiple heterogeneous, abnormally enlarged lymph nodes are identified within the porta hepatis and portacaval regions. just anterior to the celiac , additional prominent and somewhat heterogeneous lymph nodes are identified throughout the retroperitoneum within the paraaortic, aortocaval, and paraspinal regions.***
- **ECHO AND EKG NORMAL**

DIAGNOSIS

- EXTRAPULMONARY
 - - Intraabdominal and hepatic tuberculosis
- Erythema nodosum
- Reactive arthritis/ synovitis secondary to Tuberculosis
- Or secondary to Post streptococcal reactive arthritis (ASO & anti Dnase B elevation)
- Hyper IGE (stool o&p Negative)
- hyper gammaglobulinemia, anemia

Treatment

- DOT Treatment with 4 agents- INH,RIF,PZA,EMB & B6
- She had some immediate side effects of emesis, and numbness and swelling of lips
- Hospitalised and single drug given each day and together before discharge home on DOT therapy, with no problems
- Treated with IM LA Bicillin monthly for Streptococcal sequelae
- Ibuprofen/NSAID for arthritis
- ASO and antiDnase B normal
- On PCN prophylaxis for 1 year



HPI

- US born 8 yr old, living in Kenya ,began to have headaches at the beginning of November 2015 .
 - Not present daily
 - Not localized.
- Around mid-December, mother noticed that her right eye deviated inward with double vision.
 - Seen by Pediatrician in Nairobi,
 - referred to Neurologist and
 - CT Brain scan done
 - Took the next flight to MN.



History

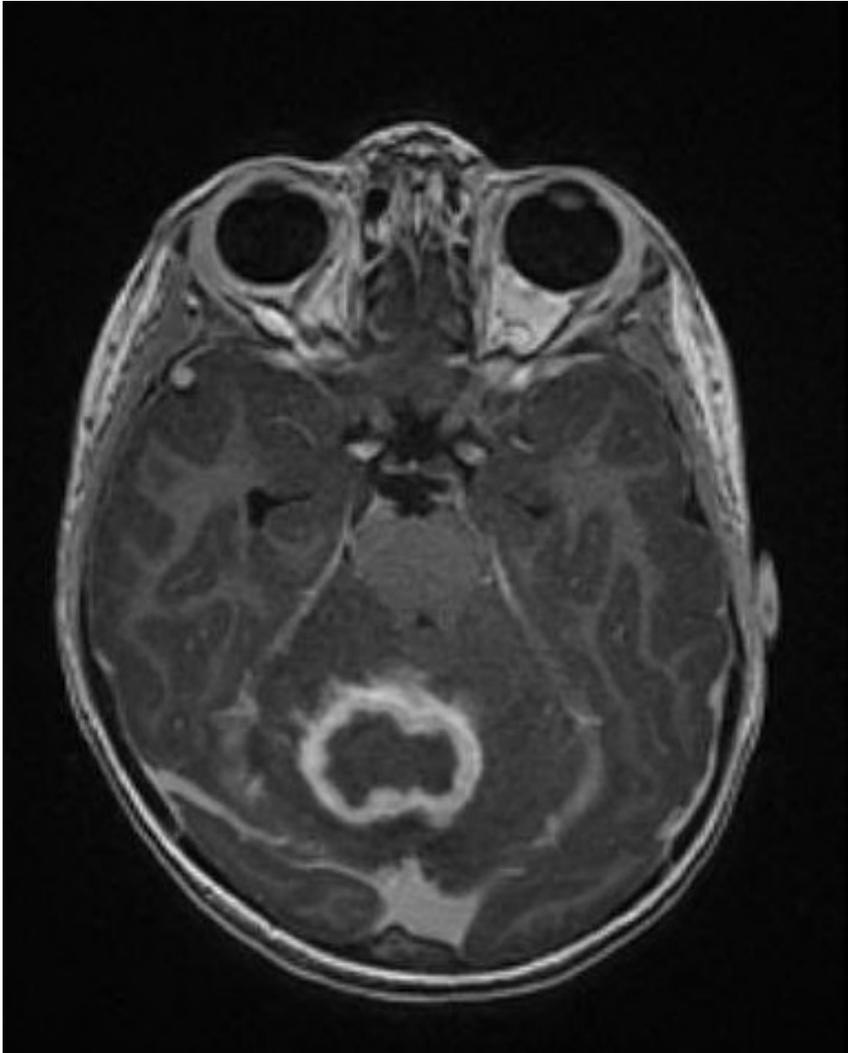
- Past Medical History:
 - No prior hospitalizations or significant illnesses.
- Takes no medications.
- Social/Family History:
 - Lived in a house in Nairobi, Kenya with her mother, 3 older siblings aged 10, 12, and 13, and 2 other adult relatives.
 - No one in the house has been sick.
 - Parents are healthy with no medical problems.
 - No family members have had unexplained persistent cough, fever, weight loss, sweats, fatigue.
 - No one in the household was ever diagnosed with TB or HIV.
 - Goes to school and is in 2nd grade.
- Immunizations: up to date through 3 years – given in MN and documented.
- Mother reported that no further immunizations were given in Kenya.



Arrival in the ED

- Admission to hospital on the Heme/Onc service “brain Tumor”.
- Physical examination, including neurologic exam, normal with exception of right eye esotropia and diplopia.
 - Could abduct eye (no CN VI palsy).
 - Optic disks seen with sharp margins, no papilledema.
- No headache on admission, smiling and doing crafts.
 - Last headache 5 days earlier.
- CXR clear.
- HIV Ag/Ab negative.
- WBC 6.3. ANC 2.6. Hgb 13.2. Plt 417.
- ESR **33**. CRP 0.38.
- Cr 0.45. ALT 20. AST 38. Alb 3.9.
- Scheduled for MRI.

MRI

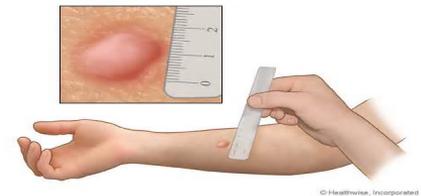


Peripherally enhancing lesion in the posterior fossa just right of midline as detailed above. The combination of imaging findings suggests that this represents an inflammatory process rather than a neoplastic one.

Tuberculoma would be the most likely consideration.

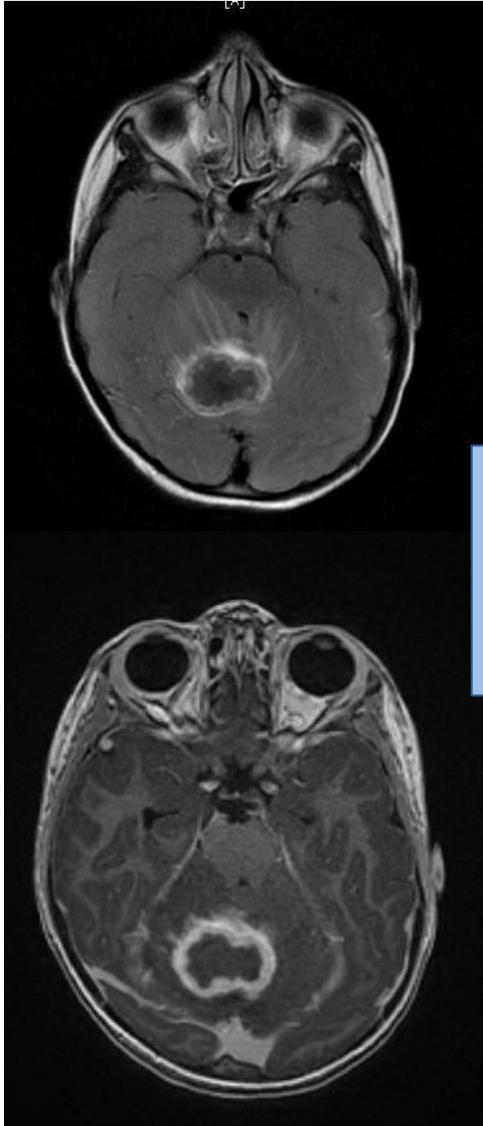
Hospital course

- High clinical suspicion for CNS tuberculoma.
- Chest/abd CT:
 - no evidence for disseminated tuberculosis throughout abdomen or pelvis.
- Lungs are clear with no evidence of active pulmonary disease.
- AFB stain and culture
 - negative from sputum, blood, stool, urine.
- Toxoplasma Ab IgM and IgG
 - negative.
- Cysticercosis Ab
 - negative.
- Started IV dexamethasone that evening, followed by 4 drug TB regimen the next morning.
- PICC line placed for **IV amikacin x 4 months**
 - **Isoniazid, pyrazinamide, rifampin Vit B6 ongoing .**
- **PPD resulted at 20 mm.**
- **Quantiferon resulted positive with TB Ag value of 10.56 IU/mL.**

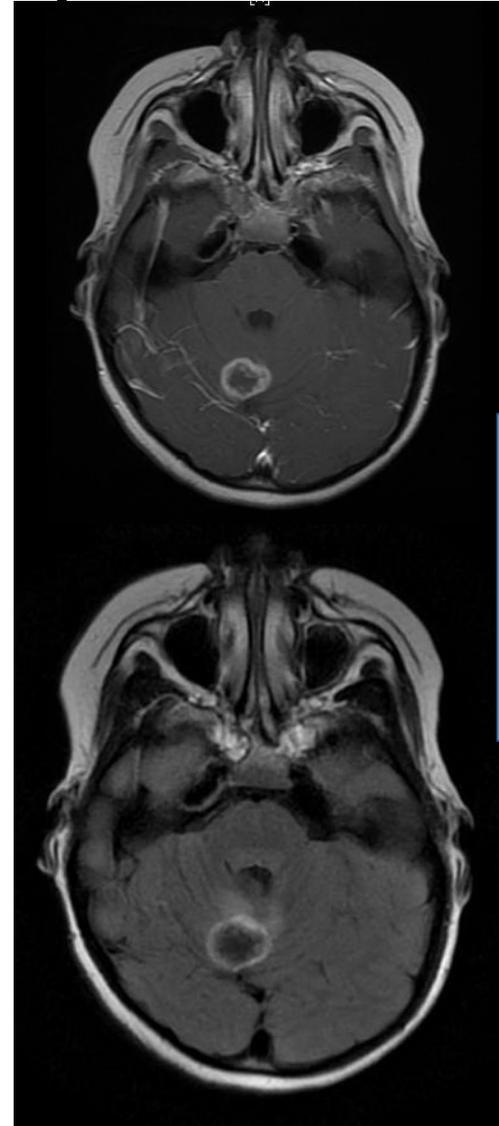


“Further considerable improvement in the appearance of the right posterior fossa tuberculoma.”
Lesion measured 2.6 x 3.0 x 2.7 cm previously, and now measures 1.6 x 1.9 x 1.7 cm.

Follow up



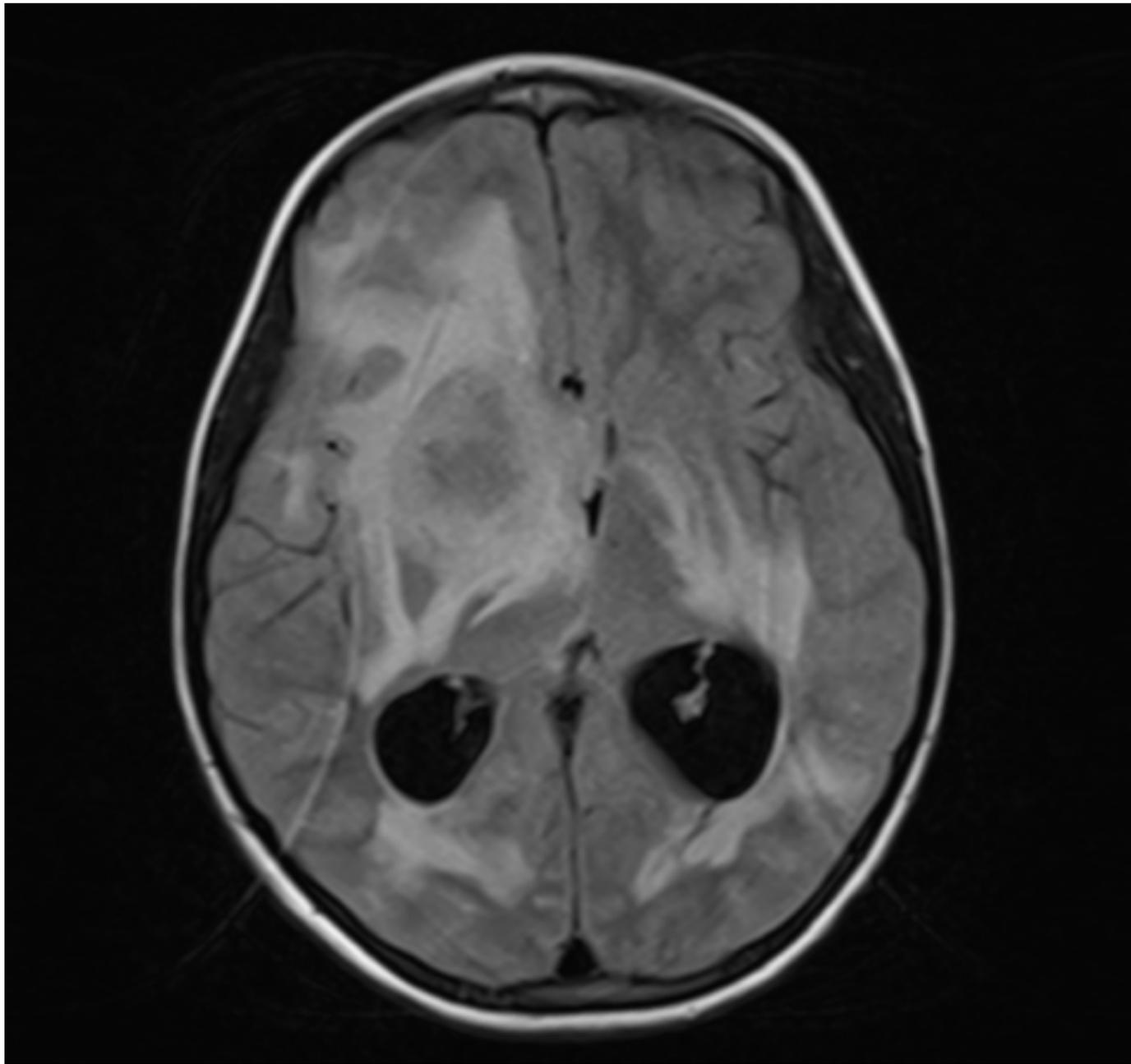
Initial MRI
prior to TB
treatment



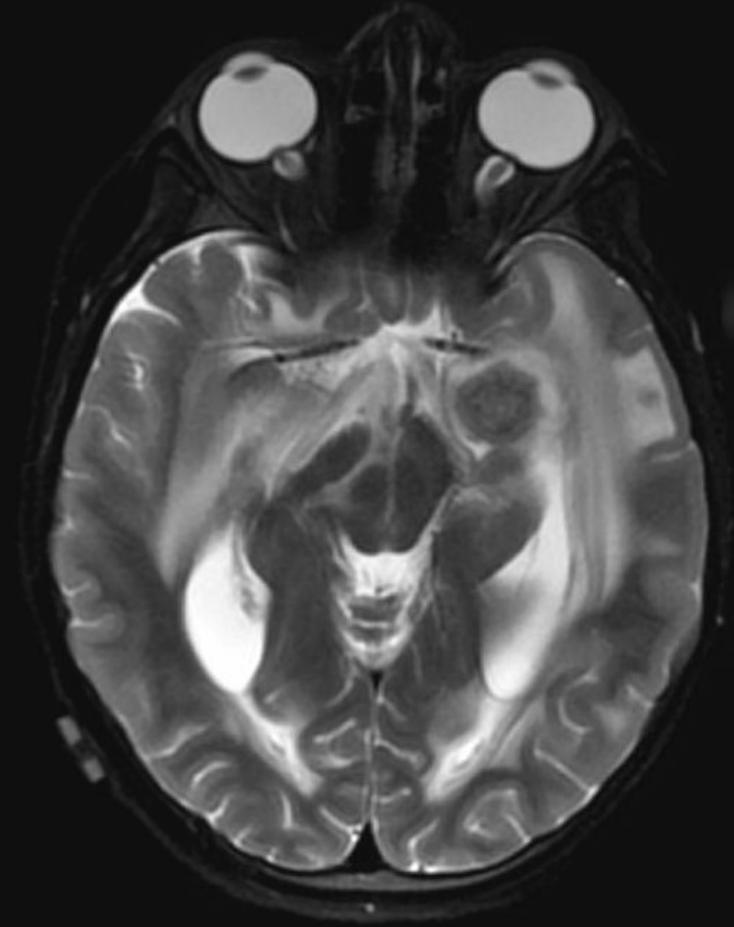
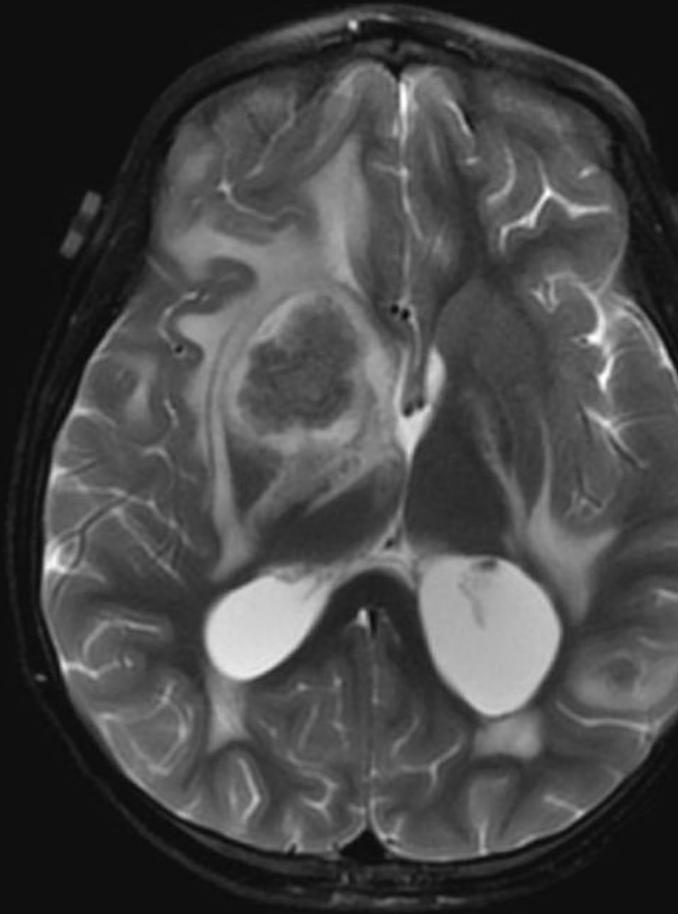
After 2.5
months of
tuberculosis
treatment

6 yr old with vision loss

- 6 year old girl who arrived in US 1.5 months earlier from Djibouti.
- On refugee screening exam had positive PPD in Illinois, 3 mos ago
- -Draining ears for months in refugee camp
- and in Illinois treated with abx.
- 1.5 months of HA and vomiting.
- Left eye turned inward, ??Vision
- -Ophthalmologic eval : massive chronic bilateral papilledema and optic atrophy.
- No light perception in left eye.



6 year old girl.



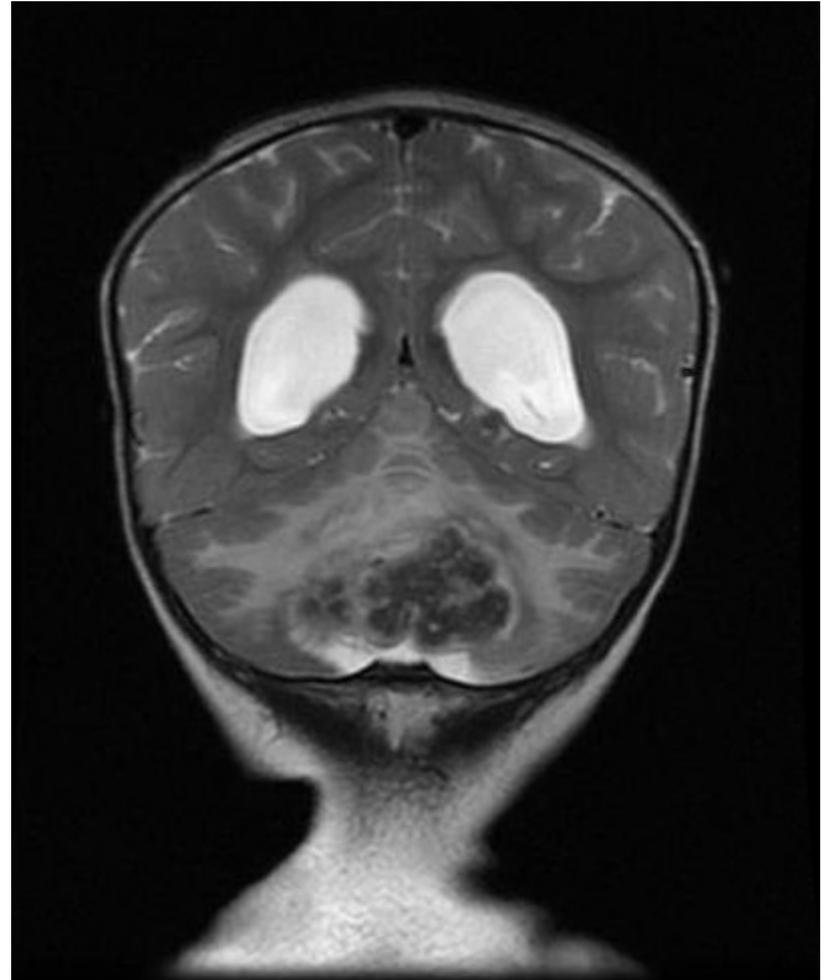
CNS Tuberculosis

- Chest XRAY, MRI spine and CT abdomen
- Normal with No evidence of old or active lesions
- Negative Hepatitis,toxoplasma,HIV,Histoplasma ,cysticercosis serology
- **Gastric aspirates negative, Ear drainage cultures Negative for AFB**
- **Diagnosed with central nervous system tuberculosis**
- **Positive PPD and Quantiferon**
- 6 weeks of steroids + 15 months of total TB therapy
- with IV amikacin x 4 months.
- No adverse effects on Rx
- But Resulted in cortical blindness due to bilateral papilledema,
- Conductive hearing loss due to bilateral perforations of the tympanic membrane
- Remains legally blind. Vision Rehabilitative services in St Cloud
- Recent Ear surgery /Tympanoplasty

Disseminated Tuberculosis

- 2 year old girl 2.5 yrs old child born in Kenya to Oromo refugees from Ethiopia
- H/o **recalcitrant ear drainage** (chronic otorrhea) at 1 yr of age, treated with multiple courses of antibiotics
- Prior h/o malaria episodes treated in Kenya
- Arrived in USA 2 months before admission
- Seen at PMD for chronic otorrhea, antibiotics given
- Admitted for fever and dehydration
- CT scan Mastoid done
- -CT head found ring enhancing lesions in brain.
- -CT chest showed large cavitary lung lesion. hilar adenopathy
- CULTURES +2/3 gastric aspirates for Mtb ,
- Positive +ear drainage culture for M tb.
- Treated with 12 months of total TB therapy,
as well as steroids IV amikacin in the first 6 weeks.
- Had moderate hearing loss – hearing aids and tympanoplasty done later

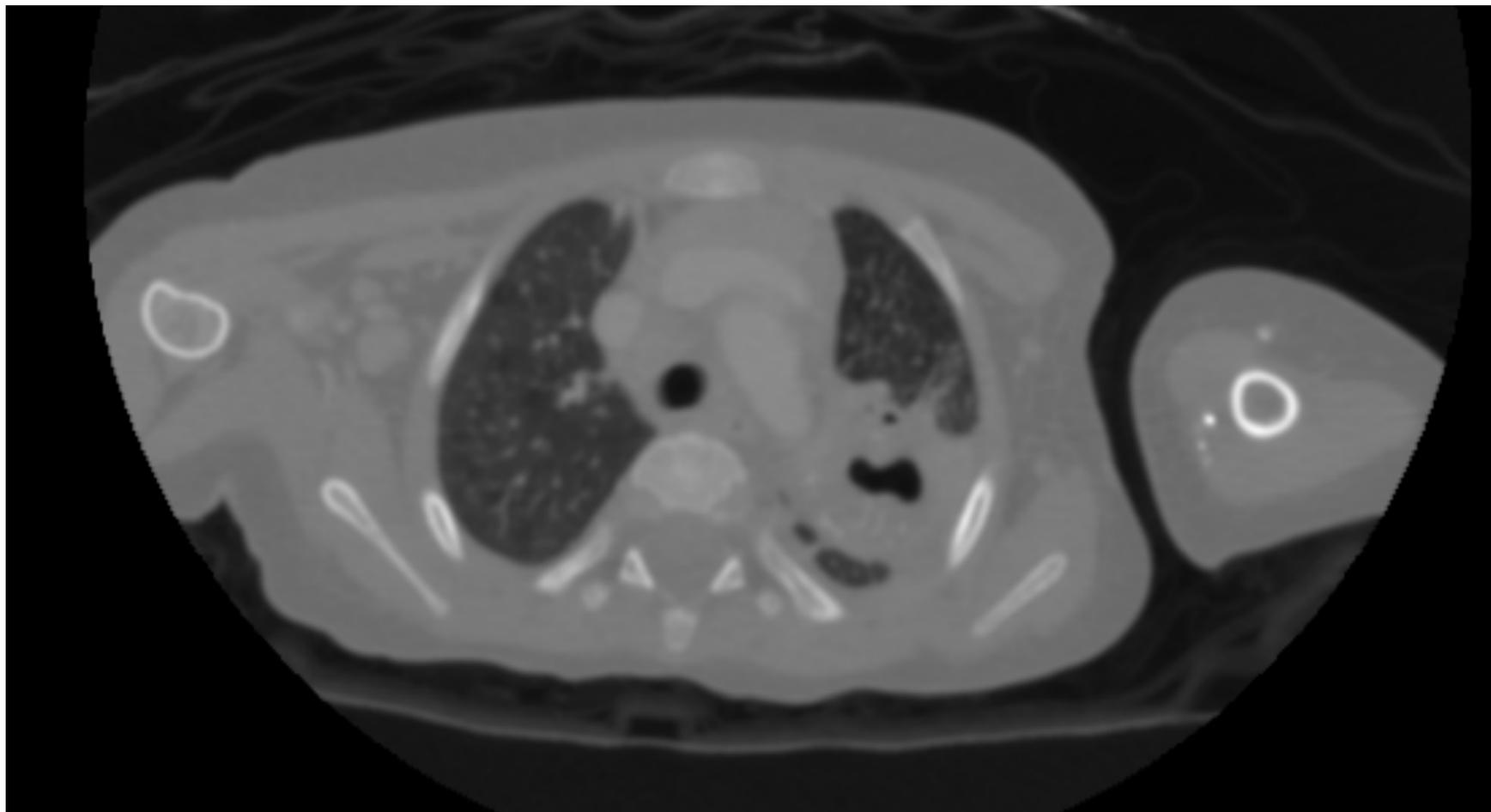
Disseminated TB in a 2 year old



Disseminated TB

- Head CT
 - Ring enhancing lesions noted on scan in basal area of brain
 - C/W Tuberculomas, with ventriculomegaly + mastoid fullness
- Chest CT
 - cavitary infiltrate, hilar adenopathy
- ABD CT
 - calcified splenic and ileal lesions

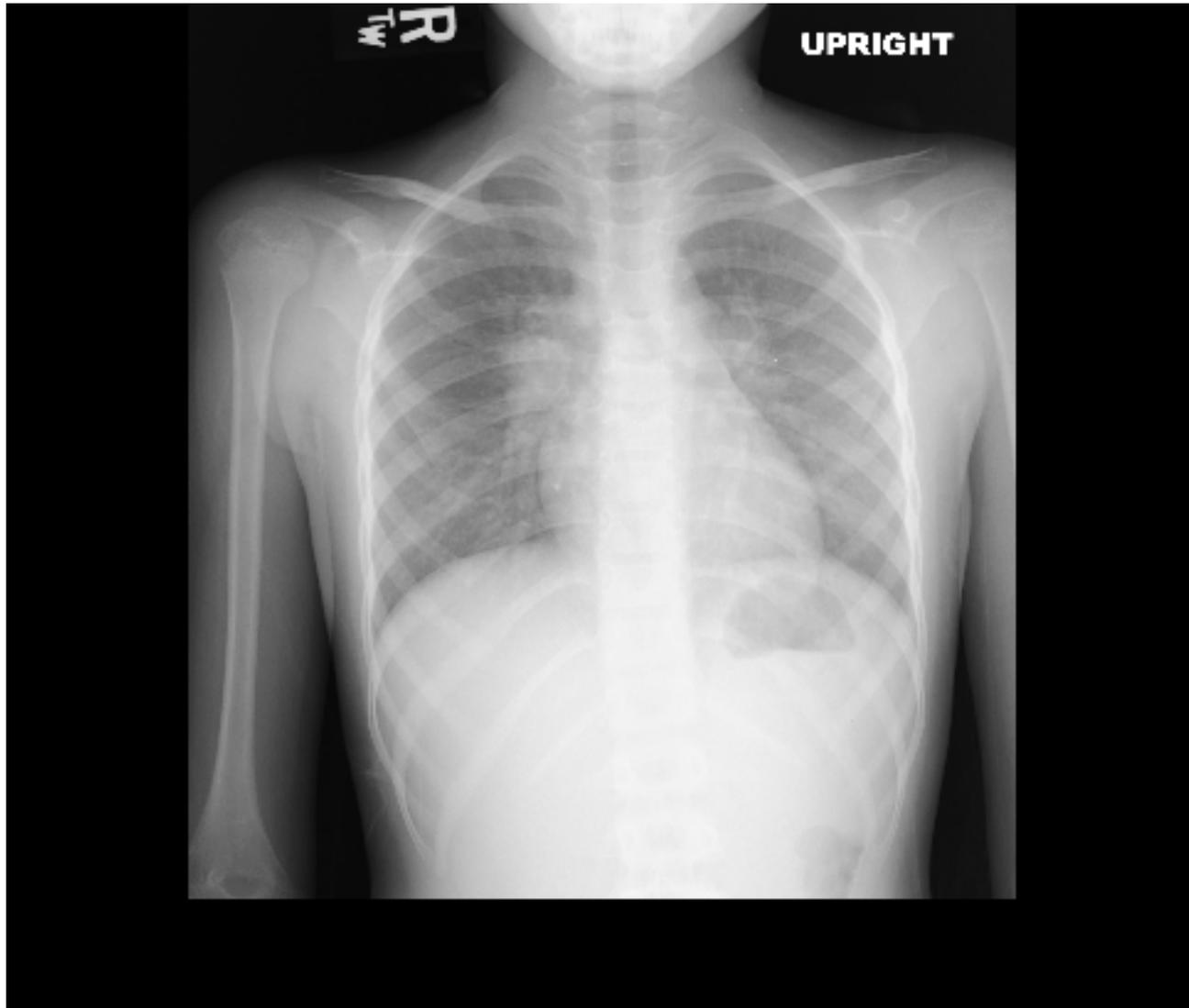
Cavitary infiltrate



MDR TB

- 6 year old F & 3 yr old M **previously healthy with positive PPD and abnormal chest radiograph at primary clinic Sept 2014.**
- Both are sibs US born , living in Nairobi, Kenya for two years and had returned to the United States two months ago.
- PPD read by PMD , greater than 10mm
- Both healthy, with no complaints of recent fevers, weight loss, night sweats, altered mental status, coughing, shortness of breath, rashes, changes in bowel movements or changes in urination.
- Very active running around the room in no distress

(6 yr old)CXR on arrival from Kenya



Diagnostic w/u

- Both sibs admitted for gastric aspirates collection
- Normal CBC, Platelets, Basic metabolic panel, AST, ALT, Uric acid
- On admission ESR 32mm/hr & 30mm/hr
- TSH normal in both
- 3 yr old's XRAY on arrival-
- ***Probable bulky right hilar lymphadenopathy with asymmetrically increased perihilar lung markings, right greater than left.***
- ***Gastric aspirates x3 on both.***
- ***Positive cultures-Mycobacterium Tb on 6 yr old. Negative Smear***
- ***Negative smears and culture on 3 yr old***
- ***Both treated with same regimen***
- ***First line Rx orally for 2 mos until susceptibilities available***

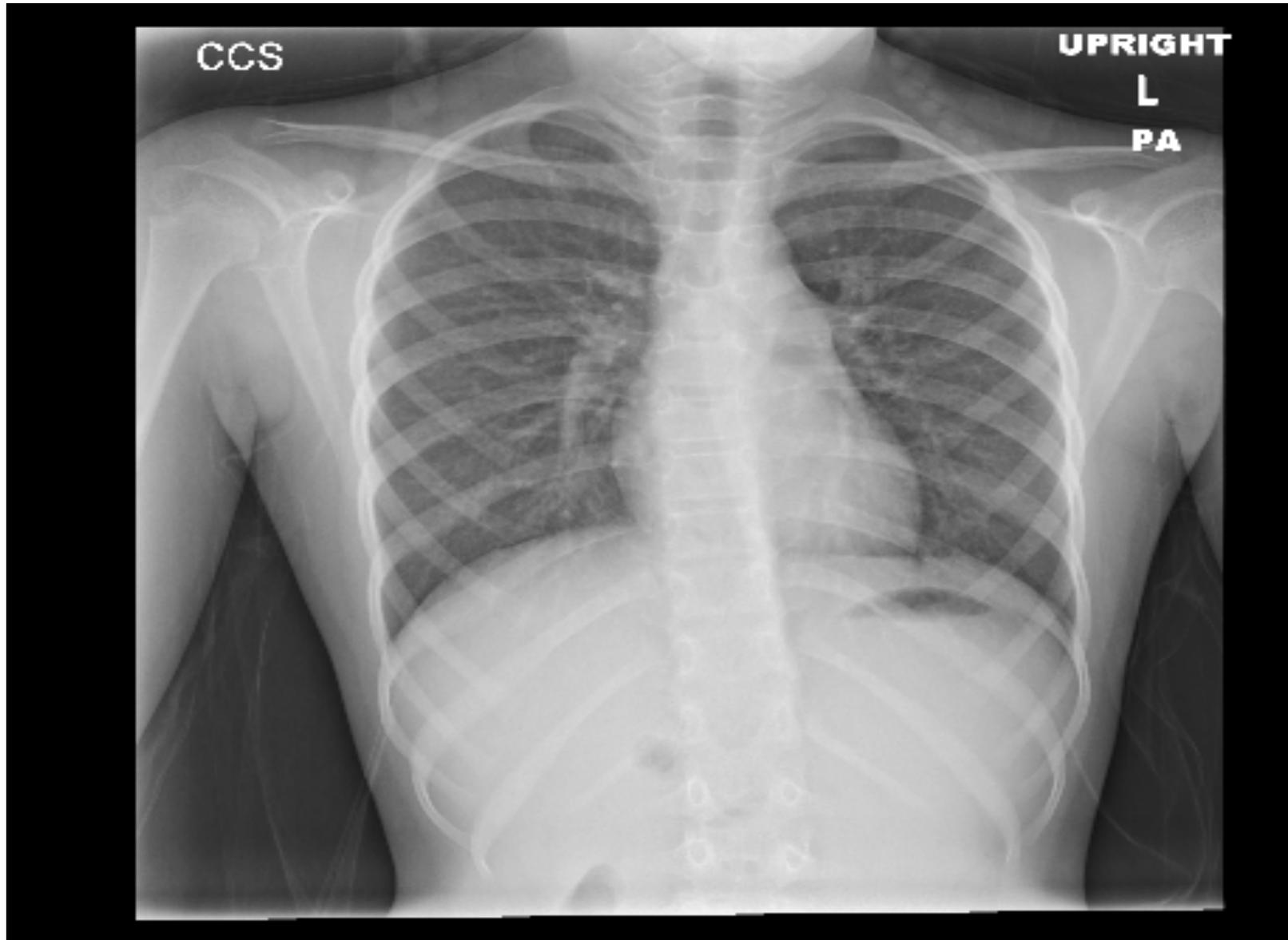
Micro Reports | **Susceptibilities** | **Specimen** | **Comments** | **Action List**

	A	B	C
1	Mycobacterium tuberculosis		
2	MIC Interp		(MCG/ML)
3	Amikacin	S	
4	Capreomycin	S	
5	Ciprofloxacin	S	
6	Ethambutol	S	5.0
7	Ethionamide	S	
8	Isoniazid 0.1	R	
9	Isoniazid 0.4	R	
10	Kanamycin	S	
11	Ofloxacin	S	
12	Pyrazinamide	S	
13	Rifampin	R	1.0
14			
15	No acid fast bacilli found (concentrated smear).		
16	MIC Interp		
17	No further testing	NRPT	
18	Multiple drug resistant organism (MDRO)		
19	MIC Interp		
20	No further testing	NRPT	

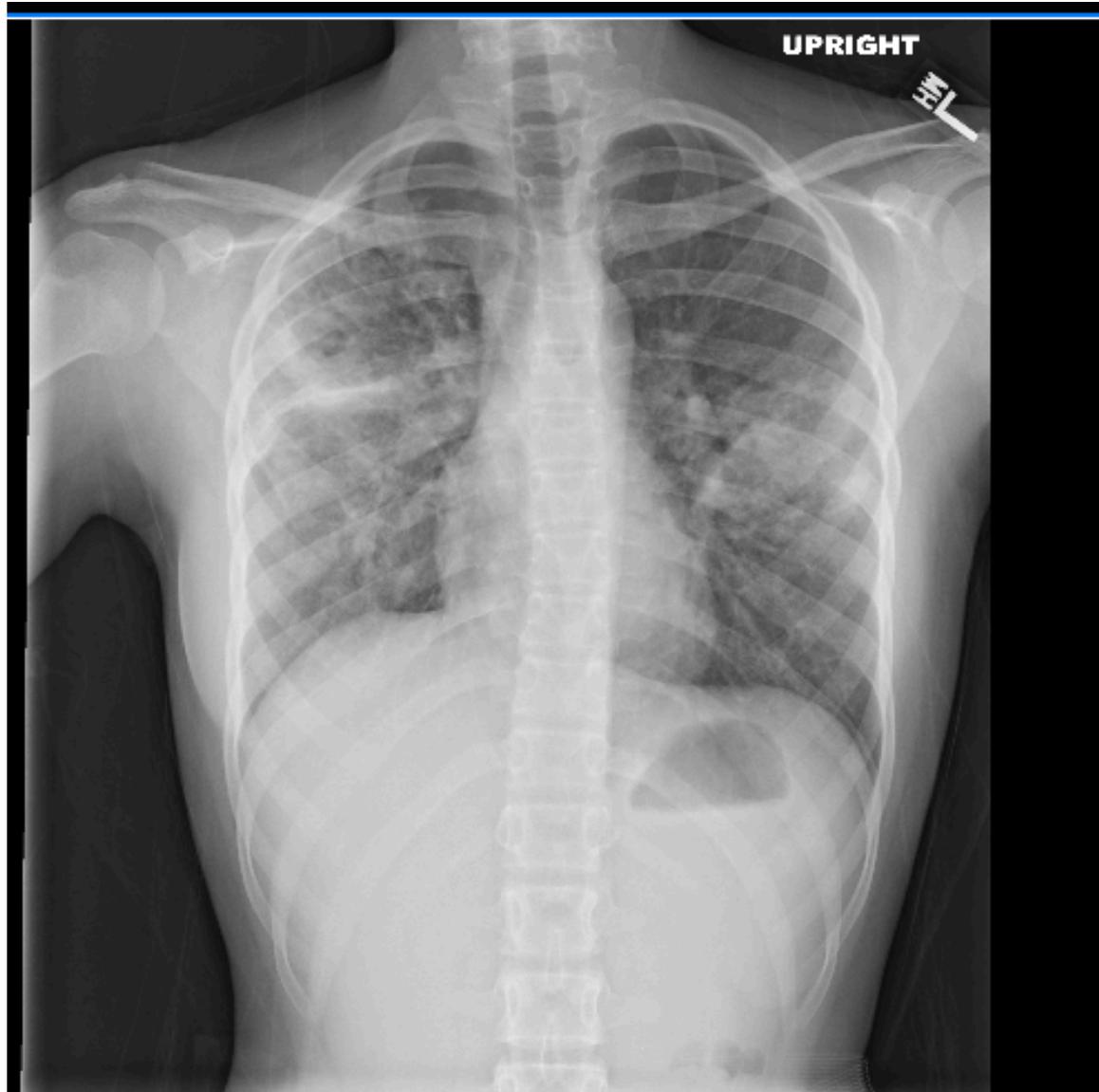
Treatment of MDR

- 18-mos DOT and HOME CARE RN
- IV amikacin (with PICC Line) Nov 2014-may 2015)
- with monthly audiology screen
- Ethambutol once daily
- Eye exam every 2 months
- Ethionamide (twice daily)with TSH follow up in both sibs
supplementation with Synthroid /levothyroxine for TSH (6&8
at peak level) in both sibs
- Pyrazinamide once daily
- Levaquin twice daily
- Tolerated treatment well /Compliance great,

MDR TB in 6 yr old after 15 mos of Treatment



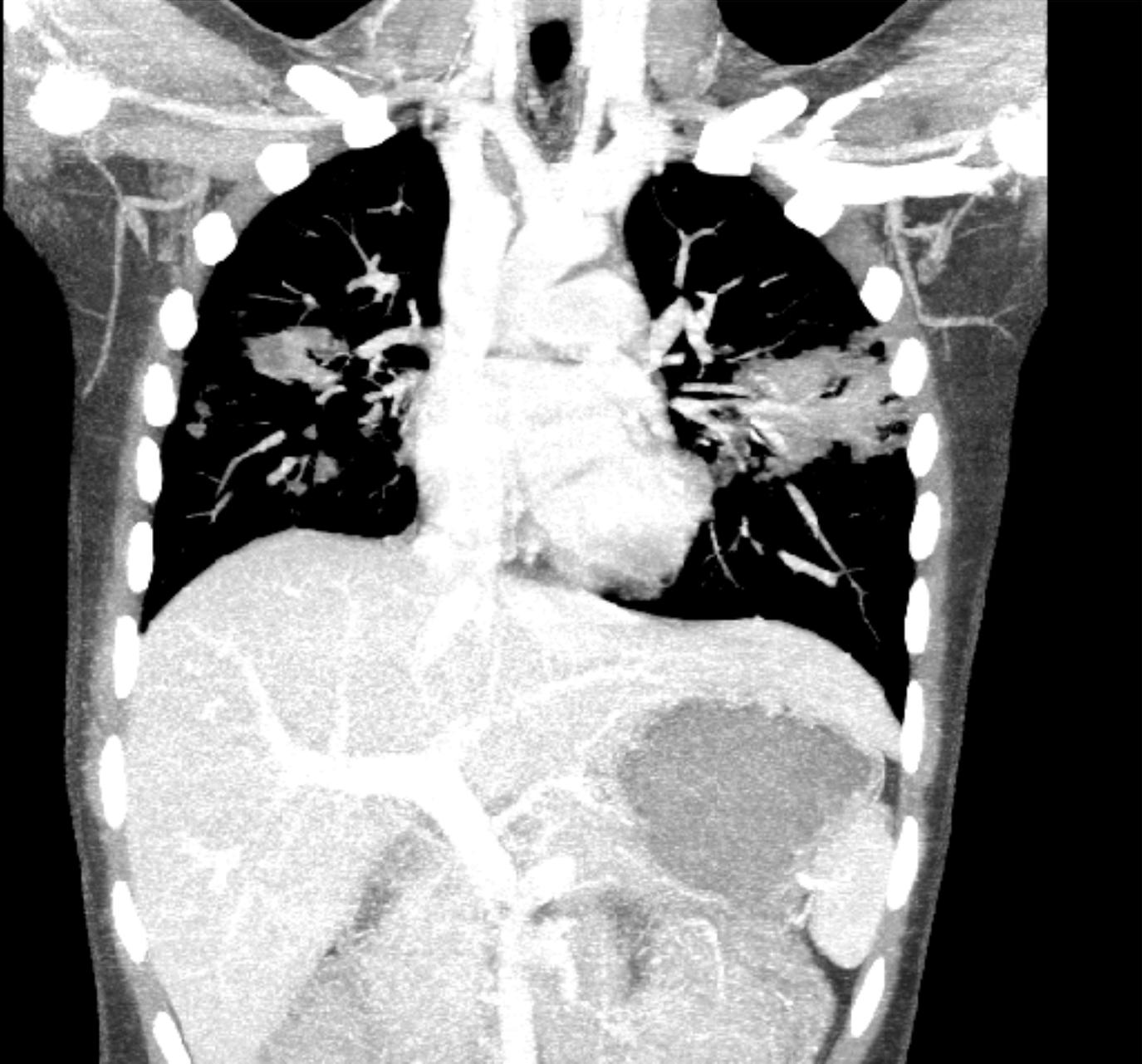
14 yr old cousin, very ill, also returned from Kenya after 2 yrs stay -
Received inadequate therapy for TB in Kenya



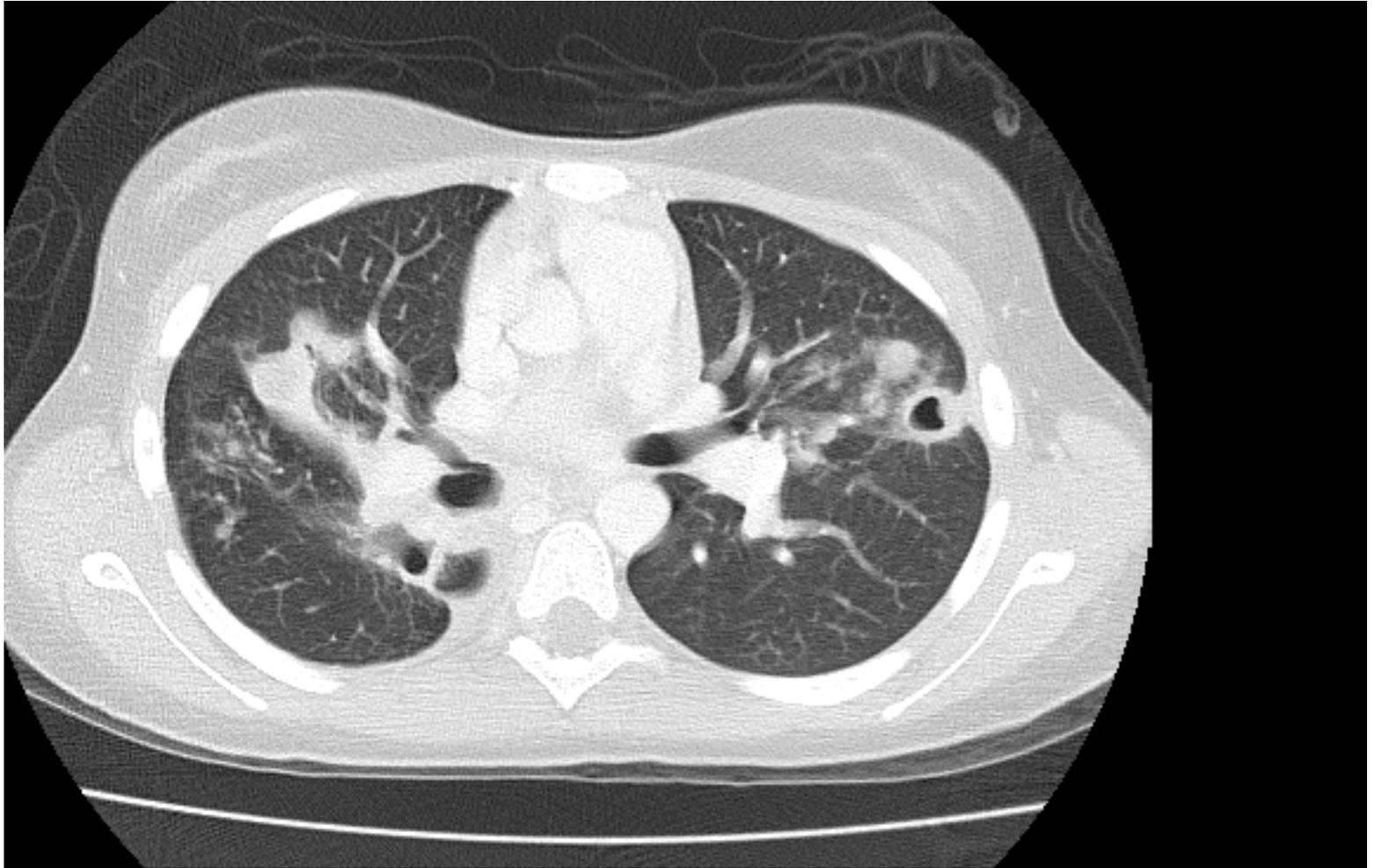
MDR tuberculosis

- 14 year old cousin of the sibs arrived from Kenya after a 2 year stay for treatment
- Ill for last 6 months receiving anti TB therapy in Nairobi, with worsening clinical status- Anorexia, fatigue, fevers, weight loss
- Family denies common TB exposure in family or close contacts in Kenya
- Mutual grandmother ill but not with TB

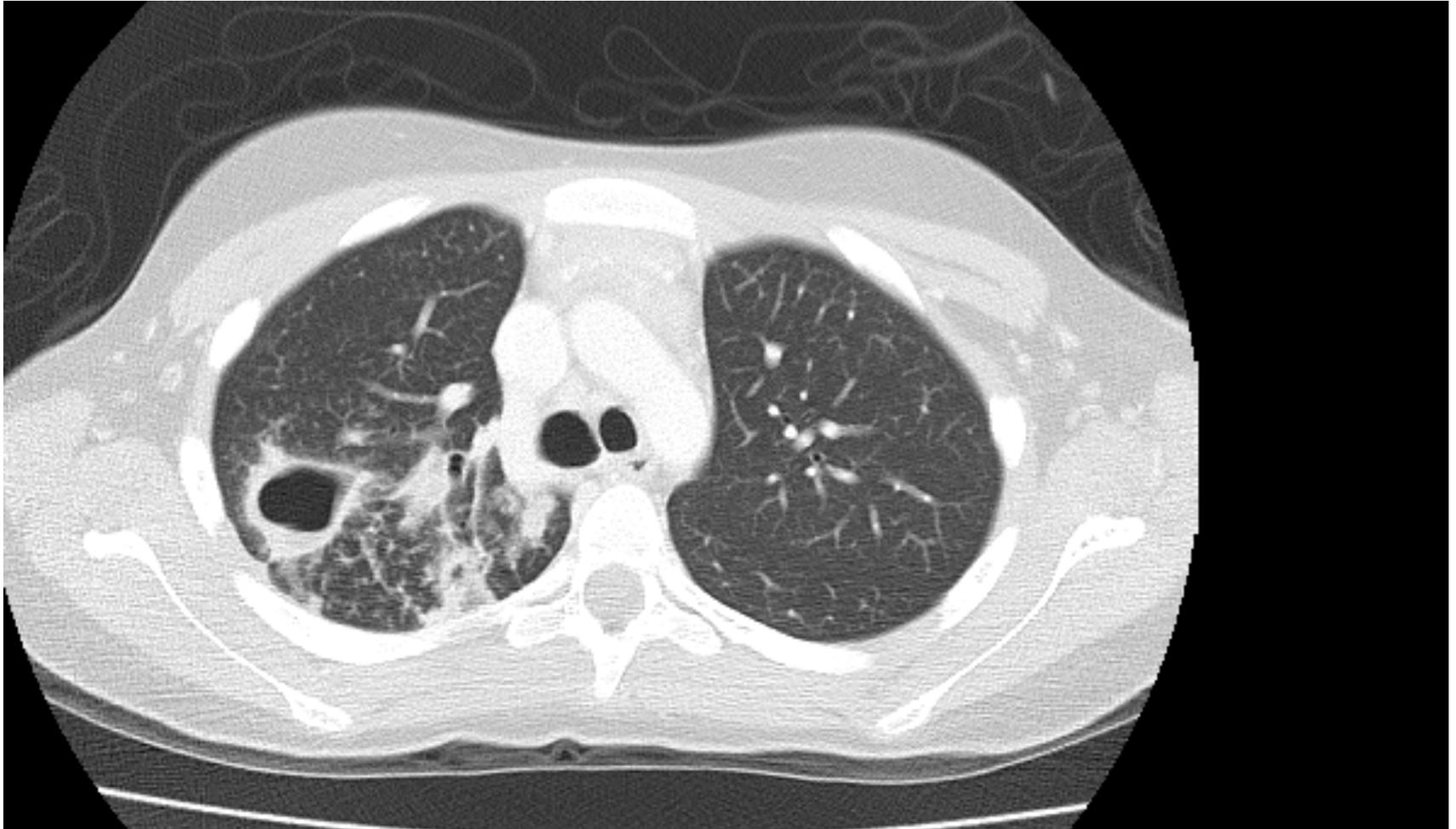
CT CHEST-Bilateral infiltrates and cavitory lesion



Bilateral Infiltrates and cavitory lesion



CT CHEST -Cavitary lesion Rt Upper lobe



Micro Reports | **Susceptibilities** | **Specimen** | **Comments** | **Action List**

	A	B	C
1	Mycobacterium tuberculosis		
2		MIC Interp	(MCG/ML)
3	Amikacin	S	
4	Capreomycin	S	
5	Ciprofloxacin	S	
6	Ethambutol	S	5.0
7	Ethionamide	S	
8	Isoniazid 0.1	R	
9	Isoniazid 0.4	R	
10	Kanamycin	S	
11	Ofloxacin	S	
12	Pyrazinamide	S	
13	Rifampin	R	1.0
14			
15	No acid fast bacilli found (concentrated smear).		
16		MIC Interp	
17	No further testing	NRPT	
18	Multiple drug resistant organism (MDRO)		
19		MIC Interp	
20	No further testing	NRPT	

Positive Smear and cultures INDUCED SPUTUM -12/23/14-2/4/15

Chest XRAY after 15mos of MDR TB Therapy in 15 yr old



LTBI or Primary Complex?

- 2 year old, US born, PPD 18mm induration on contact investigation,
- asymptomatic for cough, fever, weight loss
- **Chest Xray Normal**
- **CT scan chest shows left infrahilar lymphadenopathy with lingula infiltrate**
- Exposed to father with 4+ Smear positive active cavitary TB , ill with productive cough, weight loss, fevers for 6 months, resistant to see Western medicine physicians,
- He was hospitalised and treated with smear negative after 3 months of treatment for resistant M TB
- (INH and ethambutol resistant)

LTBI or Primary Complex

- **11mos grandchild of index case also with Pos PPD**
- **and normal CXR but abnormal CT scan-Primary complex**
- Both toddlers (uncle and nephew) DOT 3 drug RX –
- Rifampin, Levaquin and PZA
- Anti-Western medicine beliefs of index case are creating difficulties for Public health RN to administer DOT at home as father was adversarial, consideration medical foster care was done
- 11mos old Grandchild living with US born parents who have no objection to treatment and DOT
- Total of 11 sibs in family,
- 3 treated for LTBI,
- Mother positive on LTBI Rx



CT scan with hilar adenoapathy a-Primary complex TB



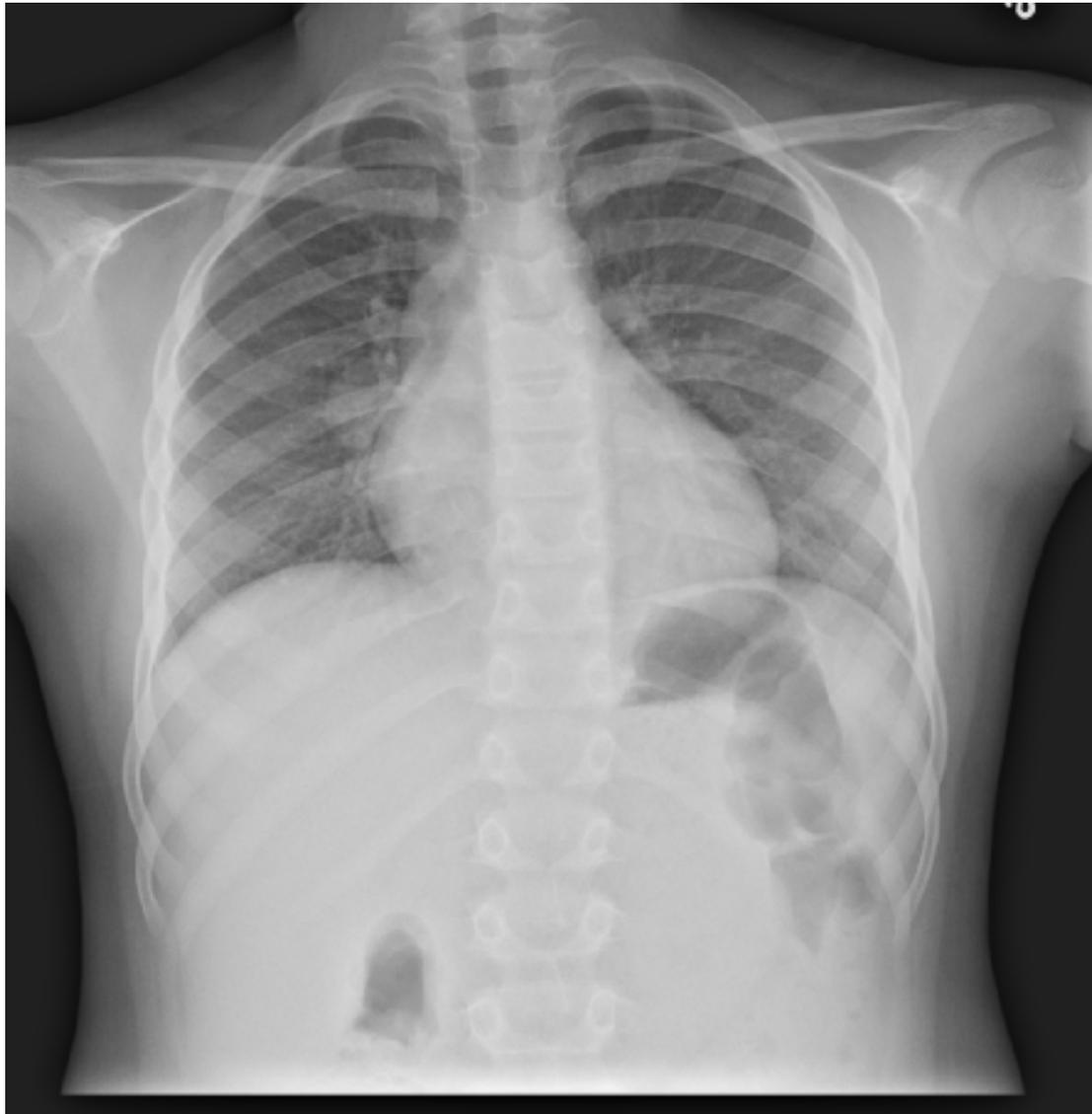
LTBI after household Exposure

- 7 year old exposed to paternal grandmother in 6/2015 in Texas ,informed of exposure 7/2015
- PPD 7/2015 in MN 5mm,Chest XRAY normal
- Returned to Texas started LTBI Rx in aug but moved back to MN for school in sept 2015
- Started INH 300mg/day 9/28/2015,
- F/u in nov doing well
- Failed f/u appointments Dec,Jan ,Feb
- Seen by PMD for abdominal pain
- Liver panel obtained

LTBI

- Elevation of AST &ALT on INH noted
- INH discontinued 3/24/16
- *Results normalised
- Rifampin 450mg /day started 4/21/16
- #Follow up labs after 1 month remain normal

Date	AST	ALT
7/15	37	16
11/15	21	53
3/22/15	174	97
*3/30/15	92	93
*4/21/16	29	52
#5/28/16	43	21



Subcarinal adenopathy in a 9 yr old with exposure to Smear positive 27y aunt



Speed: 12.5 f/s

Img 20

Erythema nodosum (Google Images)





13 yr old Sister with infiltrate & adenopathy ,infiltrate & EN exposed to same aunt