Childhood TB – Case Reports

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CNS Tuberculosis

- 7 year old from refugee camp in Djibouti arrived in USA 3 mos ago, “100% well”
- Past History of jaundice at 3 years of age and chronic ear drainage with hearing loss
- Tested in Illinois, PPD +ve but CXR not done as she was treated for chronic ear drainage with 2 weeks of amoxicillin
  - INH was deferred
  - immunisations started
- 2 sibs 12 yrs & 10 yrs with +ve PPD, started on INH, mother was 7 mos pregnant and delivered healthy infant in Illinois
- Arrived in MN - 1 mos prior to admission (10/23)
  - developed emesis, headache, left eye deviation
  - decreased vision in one eye seen by ophthalmologist the day before admission and noted to have optic atrophy, papilledema in left eye with no vision
CNS Tuberculosis

- MRI Brain-
  - Multiple ring enhancing lesions
  - obstructive hydrocephalus
  - white matter edema around lesions
  - slight midline shift
  - Mastoids with increased T2 signal
- MRI cervical, thoracic and lumbar spine
  - normal;
- Chest XRAY
  - No evidence of old or active lesions
- CT Chest
  - abnormal mediastinal granuloma and paraortic lymph nodes
- CT scan Mastoid
  - bilateral opacification
- CT Abdomen
  - normal
- Negative Hepatitis, toxoplasma, HIV, Histoplasma, cysticercosis serology
- Positive PPD and Quantiferon
- Gastric aspirates negative, Ear drainage cultures Negative for AFB
CNS Tuberculosis

- Serology - negative
  - Hepatitis, Toxoplasma, HIV, Histoplasma, Cysticercosis
- **Positive PPD and Quantiferon**
- Gastric aspirates
  - negative for AFB
- Ear drainage cultures
  - negative for AFB
CNS Tuberculosis

- Treated with Decadron for increased intracranial pressure
- Started 4 drug antituberculosis treatment 8 days later
- Amikacin IV X 8 weeks, with prednisone taper for 8 weeks
- PZA, INH and Rifampin DOT
- Completed 12 mos of Rx this November
- No symptoms but irreversible bilateral vision loss receiving Visual Rehabilitation
- Ear surgery planned for early next year
- Delightful, engaging child attends and loves school, normal speech and behavior, family coping with disability, cooperative and compliant
Disseminated TB

- 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 and CT scan Mastoid done

**Head CT**
- Ring enhancing lesions noted on scan in basal area of brain
- C/W Tuberculomas, with ventriculomegaly + mastoid fullness

**Chest CT**
- Cavitary infiltrate,

**ABD CT**
- Calcified splenic and ileal lesions
Cavitary infiltrate
Disseminated TB

- Positive PPD,
- HIV neg, Iron deficiency anemia, (drinks milk, no solids)
- Hearing impairment with speech delay
- Gastric aspirates and Ear cultures positive for M.Tb
- Family
  - 3 sibs older negative PPD, mother with +ve PPD negative CXR, dad healthy
- TB therapy for > 12 mos with steroids used initially to reduce intracranial complications
- Hearing loss persistent after Rx of TB otitis media and tympanoplasty and mastoidectomy
Paradoxical reaction

- 9 yr old female arrived from West Africa at age 3, Sickle Cell plus Beta Thalassemia
- h/o malaria x 1 in Ghana
- PPD +ve at age 6, CXR Negative, Isoniazid LTBI Therapy prescribed but incomplete with non adherence

At age 6
- CT scan for abdominal pain
- Soft tissue in Porta hepatis & in aortocaval area, Lymph nodes

At age 9
- Bilateral Chronic bilateral cervical Lymphadenopathy
- intermittent fevers non tender, non erythemaous
- treated with numerous courses of antibiotics over 2 mos
- Erythema Nodosum on shins, mild hepatomegaly

Serology
- Negative for CMV, Toxoplasma, HIV positive for EBV and bartonella

PPD
- 15mm but CXR normal
Paradoxical reaction

- Excision Biopsy Positive for AFB on smear, M Tb complex DNA by rapid PCR, DNA probe & Culture

- Resistant Isoniazid, rifampin, Rifabutin & SM

- Susceptible to Ciprofloxacin, Ofloxacain, Capreomycin, Kanamycin, Amikacin, Ethionamide, Ethambutol & PZA

- 0-2mos – INH, RIF, EMB, PZA - DOT

- After 2mos- IV Amikacin 450mg 3/week X4mos,

- Ethambutol, Pyrazinamidine, Ethionamide, Levofloxacain

- All above DOT, medication blood levels adequate
Paradoxical reaction

- Cervical nodes on Left side increased at 4 mos after therapy, progressively increased in next 3 months on both sides causing disfigurement from size and neck pain; no obstruction of airway
- At 7 mos post Rx - Fine needle aspiration of Lt node x 2 to debulk size
- Drainage from site of previous biopsy on Rt with fistula tract
- Cultures from both negative for AFB
- At 9 mos post Rx - **severe abdominal pains**
- CT scan abdomen
  - to r/o acute abdomen
  - retrogastric mass near head of Pancreas with fevers, decreased appetite and weight loss
- At 10 mos exploratory laparotomy
  - extensive adenopathy in mediastinal
  - retrogastric hilum of liver and spleen, small cluster of nodes removed
  - Negative on culture, for *M. tuberculosis* but Histology c/w granulomatous infection/TB
Paradoxical reaction

• Severe disfigurement of neck, school absentia prompted surgical excision of cervical lymph nodes
• Two surgical procedures over next 3 mos
  • modified radical neck dissection on left with removal of 100 gm wt of nodes and left internal and external jugular vein as they were densely adherent to caseous nodes
  • rt side neck dissection with excision of fistula - veins intact.
• All tissue smears & cultures negative for M. tb
• histology c/w granulomas and caseating necrosis
• 16 mos of DOT with PZA, EMB, Levo, ethionamide, uneventful
• No recurrence of Lymphadenopathy at 2+ yr post treatment
• Regular f/u in sickle cell comprehensive clinic - 2013
Paradoxical reaction

- The incidence of paradoxical reactions in the recent literature in non HIV infected cases is 6-30%, with 60-80% of these in extra pulmonary and disseminated TB with median time of onset at 60 days after initiation of anti TB therapy. Similar to IRIS in HIV infected

- Due to ? Lower baseline lymphocyte counts at initial diagnosis of Tb with surge in lymphocyte count at time of Paradoxical reactions

- Surgical intervention in 60%, or recurrent aspiration and/or steroids
Erythema nodosum  (Google Images)
Family Cluster of Erythema Nodosum

• **INDEX Case**
  - 27 yr old arrived in USA 18 years ago
  - ppd negative at time of arrival
  - Living in NYC for past 2 years
  - h/o alcoholism

• Developed cough symptoms over 2-3 months
  - Rx as pneumonia with antibiotics
  - worsening of cough, weight loss with anorexia and fevers
  - returned home to family in MN for care as bedridden

• Admitted to hospital in Minnesota in 10/11 with *erythema nodosum/EN*
  - sputum 4+smear positive for AFB - for many months
  - successfully treated in MN with **DOT**

• Has a large extended family with multiple sibs raised in MN
  - children of sibs US born

• All members of family English language proficient
Erythema nodosum - cluster

Her 37 year old sister developed EN in Oct 2011, CXR negative, Quantiferon positive, LTBI RX deferred (8 weeks pregnant)

Sister’s 13 year old daughter, in Nov 2011
devolved EN lesions,
+ve PPD and Quantiferon
abnormal CT scan but negative sputum
(See CT Scan) received DOT triple drug RX

Sister’s 9 year old son (ex Premie 27 weeks)
negative PPD 12/6/11 on contact investigation
developed *Erythema nodosum*
painful lesions on both shins 12/17/11, no cough, fever or night sweats, +ve PPD
Abnormal CXR on 12/23/11
Recd 3 drug DOT (see scans & Xray)

• Sister’s 10 yr old, and husband Negative PPD,
• 7 yr old with LTBI
• 4.5 yr old sister’s child also PPD negative on window Rx, remained negative on retest after 10 weeks
Subcarinal adenopathy in a 9 yr old with exposure to Smear positive 27y aunt
necrotic adenopathy on CT in Primary Tb with Erythema nodosum
Family Cluster with EN

A close family friend “sister” with Pos Quantiferon, *Erythema nodosum*, abnormal CT scan, negative sputum culture, DOT

Brother’s close friend also a close contact also ill and admitted to HCMC on DOT

an adult niece with PoS PPD, CXR abnormal, negative sputum smear, DOT

Another friend with past h/o Pos PPD with Negative CXR, not treated and this friend’s 6 yr son with pos Quantiferon, abnormal CXR negative sputum smear and cultures treated with DOT in 5/2012

Friend’s 2 daughters with +ve PPD, Normal CXR identified in 5/2012 treated as LTBI
Family cluster

Half sister with *erythema nodosum*, normal CXR, Pos PPD, treated as LTBI
- 8 other family members with +ve PPD or quantiferon Negative CXR treated as LTBI
  - Her mother, brother, half sister’s son and a cousin’s and her 2 year old grandchild, another sister, niece and nephew,
- And a close friend and her son treated for LTBI

TOTAL cases investigated exposed to index case
- Three close contacts negative PPD in family, no Rx
- 13 on LTBI Rx, 6/13 children
- 6 on DOT (3/6 children) with multiple drug regimen for Pulmonary TB
- 1 on window treatment, 1 POS PPD treatment deferred
- Number with EN lesions 5 cases & 1 LTBI
Erythema nodosum (Google Images)
Case – reactive arthritis with TB

- 16yr old male admitted with 1 week h/o swollen cervical lymph node, fever, knee joint pain, conjunctivitis, treated with Cefazolin
- Fever persisted joint pains worsened, now with hip, ankle, neck, back pain with painful red eyes and photophobia, unable to walk
- H/o night sweats, decreased appetite, weakness after arrival in US 2 months ago from Kenyan refugee camp
- H/o worm infestation in Somalia, with ?hematuria, otherwise well
- Immunizations prior to entry in US, PPD results not available, CXR negative 1 month ago
- Diagnosis-Rheumatological disorder with episcleritis and arthritis
- Hep screen, HIV, H.pylori, Schistosoma in urine negative
Case – reactive arthritis with TB

- CXR on admission Rt U lobe infiltrate
- Two step PPD positive,
- HLA B27, rheumatoid factor and ANA negative
- BAL (bronchoscopy) positive for M.tb
- Treatment with NSAID initially for joint pains
- Resolution of uveitis and joint swelling with antituberculous therapy
- Diagnosis - Reactivation of Tb with reactive arthritis, Uveitis and adenitis
15 yr old with Rt apical infiltrate, EN, Uveitis, Arthritis
15 yr old with reactive arthritis, uveitis, EN and cavity in Rt apex
LTBI or Primary Complex?

- 2 year old, US born, PPD 18mm induration on contact investigation, asymptomatic for cough, fever, weight loss.
- Past h/o croup x2 and diagnosed as Prader Willi syndrome as newborn.
- Chest X-ray normal but 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, was hospitalized and smear negative only after 3 months of treatment for Mtb (INH and ethambutol resistant).
LTBI or Primary Complex?

- 11 sibs in family, 3 treated for LTBI, Mother positive on LTBI Rx
- 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 is adversarial
- Grandchild is living with US born parents, no problems with DOT
Cervical Lymphadenitis

- AO 15 year old arrived in USA 7 years ago from Kenya, soon after arrival noted to be Positive PPD -INH Rx given
- Healthy in High school until Mar 2012
- Right supraclavicular mass/lymph node enlarged 2.5x2.6x1.8cms
- STREP Negative , Two courses of antibiotic over 1 month, Clindamycin and Augmentin ,no change in size of swelling,
- Embarrassing visible protuberance, tender on palpation but minimal overlying erythema, no fever, chills or weight loss
- No h/o travel ,lives in South Minneapolis with family
- CT scan Right paratracheal lymph node –necrotic center, 2.5cms
- CXR Normal
TB lymph node (Google images)
Cervical Lymphadenitis

- PPD positive reading 15x12mm after 96 hours
- Quantiferon Gold In Tube 9.46IU/ml Positive
- Fine Needle aspiration under local anesthetic by ENT surgeon
- Cytology-Granulomatous inflammation
- 4 drugs EMB, INH, RIF, PZA with vitamin B6
- Directly observed treatment was started
- In 4 weeks Mtb by DNA probe positive, pansensitive,
  - (During Rx Abdominal pain-H pylori antibody positive, stool antigen negative no changes in treatment )
- 6 months later INH, RIF and B6 treatment completed with resolution
- (Review of history-INH stopped after 1 month of therapy in 2005)
Lymph node tuberculosis

• Extra pulmonary TB (if CXR negative, not contagious)
• most common in cervical region, (scrofula)
• Not as inflamed as Bacterial lymphadenitis
• Can evolve spontaneously to form fistulae with drainage of cottage cheese like material with acid fast bacilli (can be Contagious)
• May be accompanied by fever, chills, weight loss
• No response to anti bacterial (except when Fluro quinolones ie Moxifloxacin, but mono therapy will lead to resistance)
• Positive Skin test (PPD induration >10mm) and positive IGRA
• Fine Needle aspiration – good yield and very safe in right hands, minimally invasive, no scar, no fistula
• TREATMENT IS MEDICAL, with ANTI TB DRUGS
• Surgery only indicated if fistula formation for debridement and cosmetic
Lessons and themes from cases

THINK TB

• With persistent symptoms not responding to usual Rx-ie ear drainage, lymph node swelling, pulmonary infiltrate, abdominal pain, erythema nodosum

• in refugees, immigrants and their families

• If past h/o of incomplete LTBI therapy or h/o recent treatment in family circle

• TAKE A DETAILED CONTACT AND EXPOSURE HISTORY
Questions & Discussion