

Comprehensive TB Nurse Case Management June 5 – June 6, 2024 San Antonio, Texas **Debbie Davila, MSN, RN** has the following disclosures to make:

- No conflict of interests
- No relevant financial relationships with any commercial companies pertaining to this educational activity



Case Presentation

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Test Your Knowledge

Which anti-TB medication has the potential of causing hepatotoxicity?

- A. INH
- B. Rifampin
- C. PZA
- D. All of the above

Test Your Knowledge

- •Which anti-TB medication has the potential of causing hepatotoxicity?
 - A. INH
 - B. Rifampin
 - C. PZA

D. All of the above

First Line Drugs

 INH G.I. upset Rash Hepatotoxicity Peripheral neuropathy Mild CNS Toxicity 	 Rifampin G.I. upset Rash Hepatotoxicity Thrombocytopenia, hemolytic anemia Renal toxicity Flu-like syndrome Orange staining of body fluids 	 Rifabutin Rash/Skin discoloration Hepatotoxicity Leukopenia Thrombocytopenia Uveitis Arthralgias
 PZA G.I. upset Rash Hepatotoxicity Arthralgias Gout (rare 	EthambutolOptic NeuritisRash	

Second Line Drugs

 Amikacin Rash Renal toxicity Ototoxicity Vestibular toxicity Electrolyte abnormalities (hypokalemia, hypomagnesemia) Local Pain at the injection site 	 Levofloxacin, Gatifloxacin, Moxifloxacin Rash Gl upset Hepatotoxicity (rare) Mild CNS toxicity Arthralgias, rare tendon rupture Photosensitivity EKG abnormalities
 Capreomycin Rash Renal Toxicity Ototoxicity Vestibular Toxicity Electrolyte abnormalities (hypokalemia, hypocalcemia, hypomagnesemia) Local pain at the injection site 	 Ethionamide Rash GI upset, may be significant Hepatotoxicity Endocrine effects (gynecomastia, hair loss, acne, impotence, menstrual irregularity, reversible hypothyroidism) Peripheral neuropathy

Second in Line Drugs

 Cycloserine Rash CNS toxicity, may include seizure, depression, suicidal ideation,psychosis Peripheral neuropathy Skin changes (lichenoid eruptions, Stevens-Johnson Syndrome) 	 Para-Aminosalicylate (PAS) Rash G.I. upset, may be significant Hepatoxicity Reversible hypothyroidism
 Clofazamine Rash G.I. upset Discoloration and dryness of skin Photosensitivity Retinopathy 	 Linezolid Rash Myelosuppression Nausea and Diarrhea Optic neuropathy Peripheral neuropathy

Test Your Knowledge: What are Some S/SX of Hepatotoxicity?

Early Signs

- Fatigue
- Poor appetite
- Taste alteration
- Nausea
- Abdominal discomfort
- Bloating
- Minimal rash

Later Signs

- Vomiting
- Abdominal pain
- Jaundice
- Change in color of urine and stool
- Changes in behavior, memory loss







- 38 year old male diagnosed with pulmonary TB in March 2019.
- Baseline labs indicate ALT 38, AST 25, Alk. Phosphatase 37, T. bili 0.5.
- March 13 he started standard RIPE regimen.
- He received medication by daily DOT that was provided by the local health department
- May 15 (approx. 2 mos. later) susceptibility results indicate the isolate was pan susceptible and Ethambutol (EMB) was discontinued. Pyrazinamide (PZA) was also discontinued because he had already taken 2 months of this medication
- He was continued on INH & Rifampin
- June 4 (approx. 3 months after starting anti TB therapy) follow-up lab results were ALT 97, AST 304, Alk phosphatase 72, T. bili 0.8.
- An assessment was done and the patient denied any complaints.



Let's Look at the Lab Results

 Baseline LFT's:
 ALT 38, AST 25, Alk Phos 37, T. bili 0.5.

 Follow up LFT's:
 ALT 97, AST 304, Alk phos 72, T. bili 0.8

Normal Values:

- AST: 10 42 u/L
- ALT: 10 40 u/L
- Alk. Phos: 35-104 u/L
- T. Bili. : 0.3-1.2 ng/dL

Let's Do the Math

Reference Value:

ALT: 10 - 40 u/l AST: 10 - 42 u/L Alk. Phos: 35 -104 u/L T. Bili: 0.3 -1.2 ng/dL

Pt. Labs:

Baseline:

ALT 38, AST 25, Alk Phos 37, T. bili 0.5.

Follow-up:

ALT 97, AST 304, Alk phos 72, T. bili 0.8

	4			
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		-		
CO	Result	VE META	Reference Value	MP) Unit
Primary Sample Type :	Serum			
AST (SGOT)	16.00		15.00 - 40.00	U/I.
ALT (SGPT)	100.50	High	10.00 - 49.00	U/L
Alkaline Phosphatase (ALP)	15.40	Low	30.00 - 120.00	U/L
Bilirubin Total	0.60		0.30 - 1.20	mg/dL
Total Protein	6.39		5.70 - 8.20	g/dL
Albumin	2.00		3.20 - 4.80	g/dL
GFR	120.00		> 60.00	mL/min/1.73 m ³
Glucose, Fasting	100.00		70.00 - 99.00	mg/dL
Sodium	140.00		135.00 -145.00	mmol/L
Potassium	4.00		3.50 - 5.00	mmol/L
Calcium	10.00		8.50 - 10.50	mg/dL
Numero B				100 m (100
Streath B BUN	15.00		7.00 - 20.00	mg/cL

Divide abnormal lab result by higher number of reference value

Divide abnormal lab result by higher number of normal value

ALT 97/40 = ?

AST 304/42 = ?

Reference Value: ALT: 10 - 40 u/l AST: 10 - 42 u/L Alk. Phos: 35 -104 u/L T. Bili: 0.3 -1.2 ng/dL

Pt. Labs: Baseline:

ALT 38, AST 25, Alk Phos 37, T. bili 0.5.

<mark>Follow-up:</mark>

ALT 97, AST 304, Alk phos 72, T. bili 0.8



Divide abnormal lab result by higher number of normal value



ALT $97/40 = 2.45 \times ULN$

AST 304/42 = 7.23 x ULN





As the nurse managing this patient's anti-TB therapy, what are you going to do?



Hold all TB meds!!!

Probable drug induced liver toxicity



Hold TB medications!

TB medications should be held if any of the liver enzymes exceed **3x** the upper limit of normal **with symptoms** present

or

5x the upper limit of normal **without symptoms**.

- Cannot restart anti-TB therapy until LFT's <2 times upper limit of normal
 - Re-challenge medications
 - Introduce one drug at a time
 - Monitor enzymes carefully
 - Stop therapy if symptomatic or increased enzymes and eliminate last drug added from regimen



Anti-TB therapy was re-started by re-introducing one medication at a time when liver enzymes < 2 times upper limit of normal. Liver enzymes were monitored carefully. At a follow up appointment patient admitted to drinking 6 -12 oz. beers almost every day with his neighbor

What risk factors can you identify that place this patient at risk for developing hepatoxicity?

He drinks 6 - 12 oz. beers almost every day with his neighbor.



Most at Risk for Hepatotoxicity

- Underlying liver disease
 - Clarify preexisting conditions that may increase risk of hepatotoxicity
 - Hepatitis B and C
- Alcoholics
 - Take a good social history
 - Ask specific questions about daily ETOH use
- Immediate (4 months) post-partum period
- Those on other hepatotoxic medications
 - Prescribed
 - Over the counter

Case Study - Hepatotoxicity

How do we monitor him for the remainder of his treatment?

- Monitor closely/ monitor LFT's
- Review adverse effects
- Instruct patient to self monitor for side effects while on meds
- Re-educate patient to abstain from alcohol while on anti-TB medication
- Encourage compliance
- Consider a liver friendly regimen (Rifampin, Moxifloxacin/Levofloxacin, EMB)

Most importantly:

Instruct patient to stop taking TB medications <u>immediately</u> and seek medical attention if symptoms of hepatitis occur again.

Test Your Knowledge

What anti-TB medications place the patient at risk for vision related toxicities?

- A. Rifampin
- B. Ethambutol
- C. Linezolid
- D. B & C only
- E. All of the above

Test Your Knowledge

- What anti-TB medications place the patient at risk for vision related toxicities?
 - A. Rifampin
 - B. Ethambutol
 - C. Linezolid
 - D. B & C
 - E. All of the above

First Line Drugs

INH	Rifampin	Rifabutin
G.I. upset	G.I. upset	 Rash/Skin discoloration
Rash	Rash	 Hepatotoxicity
Hepatotoxicity	Hepatotoxicity	 Leukopenia
Peripheral	Thrombocytopenia, hemolytic	 Thrombocytopenia
neuropathy	anemia	• Uveitis
Mild CNS Toxicity	Renal toxicity	 Arthralgias
	Flu-like syndrome	
	Orange staining of body fluids	
PZA	Ethambutol	Streptomycin
• G.I. upset	Optic Neuritis	(no longer considered a first
• Rash	Rash	line drug)
Hepatotoxicity		
Arthralgias		
Gout (rare		

Second in Line Drugs

 Cycloserine Rash CNS toxicity, may include seizure, depression, suicidal ideation,psychosis Peripheral neuropathy Skin changes (lichenoid eruptions, Stevens- Johnson Syndrome) 	 Para-Aminosalicylate (PAS) Rash G.I. upset, may be significant Hepatoxicity Reversible hypothyroidism
 Clofazamine Rash G.I. upset Discoloration and dryness of skin Photosensitivity Retinopathy 	 Linezolid Rash Myelosuppression Nausea and Diarrhea Optic neuropathy Peripheral neuropathy

Case Study: Missed Opportunities for Identifying Visual Toxicity

- 21 year old male arrested and incarcerated in county jail in February.
- In May, after being incarcerated for 3 months he began to complain of fever, chills, productive cough, chest pain, night sweats, and weight loss. He was evaluated and given a cough suppressant.
- 8 mos later (since onset of symptoms) on October 7, he continued to have complaints of same the symptoms. He was evaluated again. This time a chest x-ray & a sputum collection was done. His chest x-ray showed left upper lobe cavitary infiltrate, and the sputum specimen was AFB smear (+) 1-10 per high power field.
- He was diagnosed with active pulmonary TB and started on a standard 4 drug regimen on October 12.
- He was responding to anti-therapy. He was afebrile, had 6 lb wt. gain, night sweats had resolved, and cough was improving
- In November, an isolate was reported as isoniazid and streptomycin resistant. INH was discontinued once susceptibilities were known, and he continued on a modified regimen with RIF, PZA, EMB with a plan to treat for 9 months

In January, he was released from jail and he started c/o difficulty driving and reading road signs (*he has now been on anti-TB therapy for 3 months*).

As a nurse managing this patient's anti-TB therapy, what would you do? Review his anti-TB therapy

- RIPE started Oct. 10,
- In Nov. he was switched to RIF, PZA, EMB

Which anti-TB medication is contributing to his vision problems?

• Ethambutol

What do we do now?

- Evaluate further (snellen & Ishihara)
- Hold EMB
- Refer to the Opthalmologist

The nurse managing his case did not re-assess him. She sent him to his "eye doctor".

A few weeks later he was seen by optometrist and given RX for corrective lenses.

• Ethambutol continued

- On May 3 he complains of worsening vision(he's been c/o vision problems for 4 months)
- Nurse assessed his vision. Baseline visual acuity in October was 20/20 both eyes, follow up visual acuity was now 20/200 in both eyes
- On May 5 the EMB discontinued; continued on RIF, PZA and Levo added to regimen to complete 9 mos of treatment and he was referred to a retinal specialist.

Ophthalmic Toxicity

Follow-up

- Seen by retinal specialist in May and June
 - DX: EMB optic neuropathy
 - Vision uncorrected: 20/200

******Nurse was *not* performing visual acuity screening (Snellen chart), she was only doing the color discrimination testing (Ishihara plates)

Vision Screening

Ishihara Testing Snellen Eye Exam







•eyeShihara



Ishihara Instructions

- Designed to give quick & accurate assessment of color vision
- Most effectively done in room with adequate daylight
- Held 75 cm from the patient (approx. arm length)
- Sit & tilt plate at right angle to patients line of vision
- Screen all plates
- Must pass 10 of 11 plates to be regarded as Normal
- If unable to read numerals use winding lines and have patient trace between the 2 X's with a finger

Ishihara Test

• Things you will need:

- Ishihara's Tests for Color Deficiency, 24 Plates Edition
- Well lit room(natural day light is preferred)
- Comfortable chair for patient
- Quiet room



009828 [RM] © www.visualphotos.com







Ishihara Results

- Document Baseline
- Document monthly
 - Screen all plates
 - Mark (X) if plate cannot be read
 - Must pass 10 of first 11 plates for test to be regarded as normal
 - Refer for evaluation if 7 or less plates are read as normal

NAME:		marcai i socessilli	cat for .	D.0.B	.:	/	/	SS#:			
Adverse Drug Reacti	on Assessment: Ask	all the below questions	to monitor	for medica	tion toxicit	y, noting th	at some sys	mptoms ma	y be more o	commonly a	255
with certain medicatic	ns. Those with** are a	associated with second-	line drugs;	those with	[†] are associ	ated with Is	oniazid/Rit	fapentine (3	HP) but m	ay also be p	nes
other regimens. Docur	nent any [+], incl. pote	ential pregnancy in wo	men, in pro	gress notes	& notify pl	iysician. R e	sults: [+]=	Present; [-	=Denies;	[NA]=Not	Ap
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Blood Pressure											T
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Abnormal behavi	ior**										Г
Allergic reaction	(specify)** [†]										Г
Bruises, red/purp	le spots on skin†										Γ
Change in heart r	ate**										Г
Change in urine of	output										Γ
Convulsions**											Γ
Dark urine (coffe	e colored) or char	ige in color†									Γ
Ears ringing/fulls	ess/hearing loss*	- AK,CAP,KM, SM									
Eye pain/irritatio	n (redness, excess	ive tears)									Γ
Fever or chills [†]		-									Γ
Flu-like sympton	15*										
Headaches (chron	nic)										
Increased gas/sto	mach cramps**										
Jaundice (yellow	skin/eyes) †										
Joint pain/swellin	ng (chronic) – PZA	ł									
Light colored sto	ols†										
Loss of appetite [†]											Г
Malaise/fatigue											Г
Memory Loss**											
Mood changes/de	pression**										
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Nervousness/Gid	diness Restlessne	55									Г
Skin discoloratio	nee.										Г
Skin rashes/itchin	ıg†										Γ
Sleep problems*											
Sores on lips or i	nside mouth [†]										L
Shortness of brea	th [‡]										Γ
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easy bruising - R	IF, RPT [†]										1
Vertigo/dizziness	/fainting [†]										1
Visual problems/	changes in vision*	*** - EMB, RBT									1
Weakness, tiredn	ess†										
Weave/Stagger w	hen walking (nor	mal gait)									Γ
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Ask women abou	t signs of pregna	ncy									Γ
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https://www.dshs.texas.gov/tuberculosis-tb/texas-dshs-tbprogram-tb-forms-resources

Snellen Eye Test

- Place Snellen Chart on wall
- Measure 20 feet from wall to where chart is placed & mark line on floor
- Have patient stand on marked line
- Have patient cover one eye with an eye cover
- Have the patient read letters aloud
- If patient misses only one letter have them continue reading the next line
- Record the last line the patient reads accurately
- Note the visual acuity measures marked at the end of each row of letters
- Ask patient to repeat the process with the other eye
- Then repeat with both eyes
- Each time, recording the last line patient reads
- You are recording the visual acuity for each eye and with both eyes uncovered



Visual Acuity

- If initial screen was conducted with corrective lenses (glasses/contacts), follow-up screens must be done the same.
- Change of 1 or more lines from initial screen in either one or both eyes must be reported to physician immediately



Managing & Monitoring Visual Toxicities

- Baseline & monthly visual acuity test (Snellen chart)
- Baseline & monthly color discrimination test (Ishihara tests)
- If change from baseline:
 - Hold Rx
 - Refer for Ophthalmologic evaluation
 - Permanent vision impairment if ethambutol continued

Initial Assessment requires that we collect thorough info @ baseline



Medical history

Co-morbidities

Medication list

Social history

TB history

Signs & Symptoms

Have symptoms improved/worsened?

Daily Monitoring

DOT log

Assess tolerance to meds daily by nurse or outreach worker

Side effects

Adverse drug reactions

Monthly Toxicity checks

Assess patient, get updates, and modify regimen if needed

Texas Department of State Health Services Tuberculosis Case and Suspect Management Plan

Patient's Name:_____ Nurse Case Manager:

Case Management Team:

Initial Report Date & Source

Directions: Blank boxes indicate week(s) TB service is to be provided. Document date and initials of the provider in the appropriate box when the task is completed. Document comments in progress notes.

	Action Interval:	0 Begin	2 Wks	4 Wks	8 Wks	12 Wks	16 Wks	20 Wks	24 Wks	26 Wks
	Date									
Consents	General Consents, L-30, L-36, HIPAA, TB-209, interpreter form PRN; TB 409, TB 410, TB 411, etc.									
Responsibility	Assign nurse case manager; establish team; document in client's record									
	Obtain medical history; document on TB-202 Obtain release (L-30); request previous medical records									
	MD evaluation/review; document in progress notes									
	RN evaluation									
Medical	IGRA or Mantoux skin test recorded in mm (if not previously done)									
Evaluation	Chest X-ray (PA & Lateral if less than 18 years)		-							
	Supervised sputum for AFB smear/culture according to protocol				√susionp stalky					
	HIV testing, unless patient has knowledge of HIV+ status or has documented negative HIV test result within 14 days of TB diagnosis									
	Labs per protocol or specific order									
	Nutritional assessment									
	Drug regimen according to protocol or specific order									
	Initiate DOT on all cases'suspects: Recommended Daily X 8 weeks, then daily or 3X/week (Mon/Wed/Fri) until completion of adequate therapy; document DOT on TB- 206; other DOT dosing schedules may be ordered.									
Treatment	Pyrazinamide X2 months and ethambutol X2 months (or until susceptibilities are reported and client's organism is known to be pan sensitive)									
	Vitamin B6 (if pregnant, diabetic, at risk for peripheral neuronathy)									
	Obtain Informed Consent form TE-411 (TE-411A, if Spanish speaking, only) initially and for any drugs added to regimen.									
Consultation	Obtain expert consult for drug resistant cases, complicated adult/pediatric cases or client who remains symptomatic or sputum positive after 2 months' therapy;									
	written consult in client record							<u> </u>		
	(TB-205 and progress note as appropriate)									
Toxicity/ Clinical	Visual acuity (Sloan or Snellen) and color discrimination (Ishihara Plates) initially and monthly if on EMB or Rifebutin: document (TB-205)									
Assessment	Hearing sweep check initially and monthly if on amikacin, capreomycin, kanamycin or streptomycin; document (TB-205)									

TE 201- Case Management Plan for Outpatient Care - Revised 08/2017

Link Patients to Community Services Aunt Bertha



San Antonio Resource Directory



https://www.sacrd.org/directory/program/292

HNTC Products @ http://www.heartlandntbc.org/products.asp



HSTRUCTIONS: Piezze complete bath pages and send to: Alysia Wayne Heartland National TB Center-2303 SE Military Drive- San Antonio, TX 78223 Piezze Complexe Buth Complexed Processing Set Military Drive-San Antonio, TX 78223 Piezze Complexed Processing Set Military Drive-San Antonio, TX 78223 Piezze Complexed Processing Set Military Drive-San Antonio, TX 78223 Piezze Complexed Processing Set Military Drive-San Antonio, TX 78223 Piezze Complexed Processing Set Military Drive-San Antonio, TX 78223 Piezze Complexed Processing Set Military Drive-San Antonio, TX 78223 Piezze Complexed Processing Set Military Drive-San Antonio, TX 78223 Mumber requested:(maximum order is 25) Mumber requested:(maximum order is 20) Seyod Driver, A journey to cultural proficion to Exitator provide rule culture of the Piezze Provide Processing		Product Order Form
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alysis.wayne@ukht.edu A. Assessing and Managing the Kis of Liver Disesses in the Trastmer of al TBI - 1 page flow diagram for clinicians and healthcare provide Number requested:		PH: (800) 839-5864 FAX: (210) 531-4590
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DSHS TB Program

the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or the spine. A person with TB disease can die if they do not get treatment.

TB disease can be cured with medical care and the right medicine. *Learn more...*

Recent News

- DSHS TB Medication Availability Notification: April 9, 2024
- TB Standing Delegation Orders and Standing Medical Orders
- Enroll in Medicaid as a TB Medical Provider



https://www.dshs.texas.gov/tuberculosis-tb



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Monitoring Goals

- Become familiar with monitoring tools to manage TB patient
 - Find what works best for you
- Educate patient to become familiar with potential side effects and adverse reactions
- Recognize problems/address complaints quickly
- Intervene rapidly
 - Minimize treatment interruptions

Complete Adequate TB treatment Sucessfully!!!!



