


Initiating the MDR-TB Treatment Regimen: Nursing Considerations

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Disclosures



- No conflict of interest



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

Objectives



Nursing considerations prior to starting treatment



Baseline labs and assessments and follow-up



Recognizing potential toxicities and adverse effects



Appropriate and timely nursing interventions



Providing holistic patient-centered care

Terminology

Mono-resistant: resistant to only one drug

Poly-resistant: resistant to more than one drug, but not the combination of INH and RIF

Multi-drug resistant (MDR): resistant to at least INH **and** RIF

Pre-extensively drug-resistant (Pre-XDR): MDR plus resistance to fluoroquinolone (FQ) **or** a second-line injectable (Amikacin, Kanamycin, or Capreomycin)

Extensively drug-resistant (XDR): MDR-TB plus resistant to a FQ **and** at least one second line injectable

Who is at risk for MDR-TB?

History of previous TB treatment, particularly if recent

Known exposure to MRD-TB case

HIV (+)

- Higher incidence of Rifampin mono-resistance

Poor response to standard 4-drug regimen

- Culture remains positive (+) after 2 months of treatment

First Client Encounter

The nurse case manager conducts a face-to-face interview with the client in efforts of develop a plan of care

- Lengthy process
- Develop a trusting relationship
- Educate patient and significant others

The purpose of the initial visit is not only to develop a treatment plan, but to physically view the client

The initial visit will give us a clue to just how ill the client is

- Frequency of cough
- Appearance (i.e. thin, frail...)

Oh No!!



Call from lab

- Sputum: Smear positive (+), culture and DST pending, NAAT: Xpert MTB/RIF (+Mtb with Rifampin resistance)

Usually Phenotypic second line tests are ordered and rapid molecular test for drug resistance also ordered

Stop meds

CDC Molecular Detection of Drug Resistance (MDDR) service (tests for INH, RIF, FQ, EMB, PZA, capreomycin, kanamycin)

DSHS Consultation

REQUIRED:

- Client is a contact to an MDR-TB, Pre-XDR, or XDR-TB
- Client has a lab confirmed drug resistance or is suspected to have drug resistance
 - Defined as resistance to INH and/or Rifampin, or to any other drug other than streptomycin on DST panel
- Consult must occur within 3 days
- Drug resistance should be considered in any client with:
 - Known exposure to an individual with drug resistance
 - Residence in a setting with high rates of primary drug resistance
 - Persistently positive smear or culture results at or after 4 months of treatment
 - Previous TB treatment, particularly if it was not DOT or if interrupted for any reason
- Client has been prescribed a second-line medication



Initiating Treatment

Medical history and physical evaluation

- Demographic information
- Full TB history
- Past medical history
- Social history
- Physical exam
- Height and weight
- Source case and contact information

Baseline exams

- Laboratory exams
- Hearing and vision
- Radiography
- Sputum
- EKG
- Psychosocial assessment

Isolate patient

Case Management



Provide patient-centered care



Stop transmission



Use at least 5 drugs (including a fluoroquinolone and a aminoglycoside)



Inpatient management



Addressing the patient's social, economic, and additional medical needs



Careful monitoring to detect adverse effects quickly and intervene to avoid significant toxicity

At Baseline

Chest X-ray (PA & Lat), compare to previous films

Request and review previous records

Create drug-o-gram

Review previous laboratory results: CBC, BUN, Cr, LFTs, 24hr Cr Clearance, Ca+, Mg, HB, HCV, glucose

HIV screening with pre and post counseling

Baseline TSH

Review previous sputum results, repeat sputum

Infection control precaution-isolation

Baseline height and weight

Drug-O-Gram

SUMMARY DATE:	NAME:	DOB:	HEALTH DEPARTMENT:	TREATING PHYSICIAN:	FILE NO:
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TREATMENT REGIMEN

BACTERIOLOGY

Date	Wt.	INH	RIF	PZA	EMB	AK	CM	MF	LF	ETA	CS	PAS	LZD			Date	spec	sm/cult	Comments

SUSCEPTIBILITY RESULTS

Date	Spec.	Lab	INH	RIF	PZA	EMB	SM	AK	CM	MF	LF	ETA	CS	PAS	LZD	RFB	BDQ			Reported

Treatment Key: ● = DDT; ▲ = SAT

Adapted from Los Angeles County TB Control Program Drug-O-Gram

Initiation of Treatment

Consider CT and alternate views

Physician assessment

Update drug-o-gram

NEW sputum collection early a.m. x3 for smear and culture

Infection Control Isolation: continue until culture negative x3

Aminoglycoside and/or capreomycin IV (IM) 5 days/week

4-6 oral medications

DOT initiated

Patient education (on-going)

Pyridoxine 100mg

Calculate BMI

Nutritional Assessment

Patient Name: SAMPLE PATIENT

Treatment Start Date: May 5, 2015

Treatment Regimen: EMB, Moxifloxacin, Amikacin, Linezolid, PAS

Activity	Baseline	Month of Treatment																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Date	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
CLINICAL MONITORING																			
Sputum smear and culture ¹	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CXR ²	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weight ³	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Symptom review	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DST ⁴	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAB MONITORING FOR TOXICITY / CO-MORBIDITIES																			
CBC ⁵	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creatinine ⁶	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LFTs ⁷	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K+, Ca, Mg ⁸	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drug level ⁹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TSH ¹¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HIV ¹²	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pregnancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MONITORING PROCEDURES																			
Audiogram ¹³	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vestibular exam ¹⁴	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vision exam ¹⁵	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peripheral neuropathy ¹⁶	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arthralgias ¹⁷	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depression ¹⁸	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EKG ¹⁹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

***Important: Monitoring recommendations may change if treatment regimen or patient status changes. A box indicates monitoring activity is recommended. Check box when activity is completed.**

- 1 Collect three AFB smear and culture specimens every 2 weeks until smear conversion, and then 2-3 specimens monthly until cultures have converted to negative. Once cultures have converted, obtain at least 1 specimen monthly throughout therapy.
- 2 Obtain baseline CXR and monitor q 3 months during the first year and q 6 months in the second year of treatment.
- 3 Monitor weight monthly and adjust medications as needed.
- 4 Monitor for symptoms monthly.
- 5 Obtain first- and second-line DST results at baseline. Repeat if patient on RIPE and remains culture positive prior to MDR-TB Rx, and again if patient fails to convert culture after 3 months on treatment.
- 6 Obtain weekly for first month, then monthly for patients on linezolid.
- 7 Obtain creatinine at baseline and monthly while patient is on an injectable agent.
- 8 LFTs at baseline and then monthly while patient is on PZA, ethionamide or PAS.
- 9 K+, Ca++, and Mg++ at baseline and monthly while patient is on an injectable agent.
- 10 Therapeutic drug levels (TDM) should be obtained for patients receiving cycloserine after 2 weeks on therapy and if signs of toxicity develop. TDM may be obtained for other drugs as clinically indicated.

- 11 Monitor TSH at baseline and every 3 months while patient is on ethionamide or PAS, and more frequently if symptoms or abnormalities.
- 12 Obtain baseline HIV.
- 13 Perform audiogram at baseline and monthly while patient is on an injectable agent.
- 14 Perform vestibular exam at baseline and monthly while patient is on an injectable agent.
- 15 Perform visual acuity plus color discrimination exams at baseline and monthly while patient is on ethambutol or linezolid.
- 16 Monitor for peripheral neuropathy at baseline and monthly while patient is on linezolid and as clinically indicated for patients on fluoroquinolones.
- 17 Monitor for arthralgias at baseline and monthly while patient is on PZA or fluoroquinolone.
- 18 Monitor for depression, agitation, or mental status change at baseline and monthly while patient on cycloserine.
- 19 Obtain EKG at baseline and at least 2, 12, and 24 weeks for patients on bedaquiline and at baseline and after treatment start for patients on fluoroquinolones as clinically indicated.

MDR TB CARE PLAN

Baseline	Initiation of Treatment	Month 1	Month 2	Month 3	Month 4	Month 6	Month 9	Month 12	Month 18	Month 24
CXR-PA/Lat, Compare to old films	Consider CT & alternate views			Consider CXR		CXR		CXR Consider CT	CXR	CXR Consider CT
TST/Report case										
Request/review old records	Physician assessment	Physician assessment q 1-2 wks	Physician assessment q 1-2 wks	Physician assessment q month						
Create drug-o-gram	Update drug-o-gram	Update drug-o-gram								
Review prior lab: CBC, BUN, Cr, LFT's, 24 hr Cr Cl*, Ca#, Mg#, HB, HCV, glucose		CBC, BUN, Creat, LFT's, K, Ca, Mg at least q month								
HIV screen with pre/post counseling		If positive CD4, viral load	If positive evaluate for treatment							
Baseline TSH				TSH q 3 months if on PAS and/or Ethionamide. If elevated Levothyroxine Rx						
Review prior sputum results. Repeat sputum	Sputum q a.m. x3 days smear & culture	Sputum q a.m. x3 days smear & culture	Sputum q month culture							
Review susceptibility, request extended susceptibility test [†]			Repeat susceptibility if sputum positive	Repeat q month if culture positive						
Infection control isolation	Continue until culture negative x3									
	Aminoglycoside and/or Capreomycin IV (IM) 5 day/wk	Peak/trough drug level	Peak/trough drug level		Peak/trough drug level	Δ to 3x/wk after 4-6 months if culture negative	D/C after culture neg x6-12 month			
	4-6 oral drugs	Peak drug levels 2 hrs post dose (PAS 6 hr)		Peak drug levels 2 hrs post dose (PAS 6 hr)				Peak drug levels 2 hrs post dose (PAS 6 hr)		
	DOT initiated/patient educated	Educate as needed								
	Pyridoxine 100mg	As long as ethionamide, linezolid, or cycloserine given								
Baseline weight & height	Calculate BMI	Weigh weekly	Weigh monthly							
	Nutritional assessment	Nutritional supplement as needed (no milk products, aluminum, CA, Mg containing antacids, iron or MVI's within 2 hours of fluoroquinolone)								
	Audiogram/vestibular screen. Continue monthly as long as aminoglycoside/capreomycin given									
	Vision screen. Continue as long as ethambutol, rifabutin, linezolid, clofazamine given									
Assess & Address	Substance abuse/psychosocial factors influencing compliance									
	Education needs/completion of Assess & Address contact evaluation with health department									

*Repeat clearance if decreased & adjust medications (aminoglycosides, capreomycin, ethambutol, PZA, levofloxacin, cycloserine)

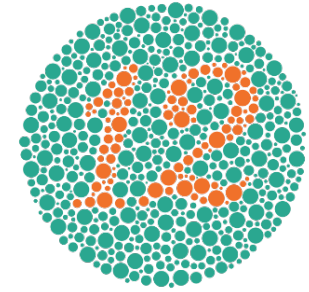
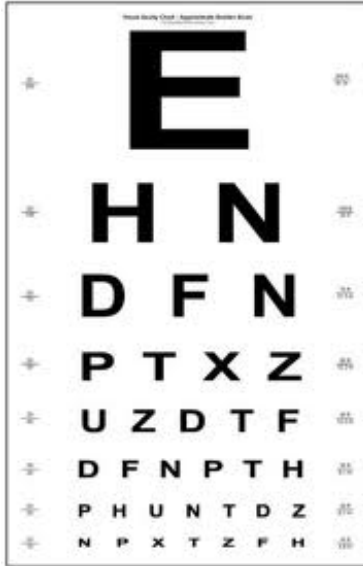
† For patients at high risk for MDR-TB request rapid molecular assay for drug resistance [consultation required]

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CHART REVIEW

Patient label: _____

Intermediate Outcomes	Time Frame	Date(s) Accomplished				
TB Contact Interview	3 days					
Contacts Identified and tested	15 days					
Medical evaluation of TST + contacts	30 days					
Appropriate medication regimen	at 1 st visit/monthly					
DOT arranged	24 hours					
Testing/Screening	Baseline and <u>prn</u>					
• Blood						
• Vision						
• Hearing						
• Sputum						
• Peripheral Neuropathy						
• X-rays						
• HIV						
Sputum Smear Conversion	2-3 weeks					
Sputum Culture Conversion	8-10 weeks					
Clinical Improvement	Monthly					
• Subjective						
• Objective						
Patient Education						
• Initiation	At 1 st visit					
• Documented	Monthly					
Appointments						
• Physician follow-up	Monthly					
• DOT adherence	Monthly					
• Referrals	PRN					
Nursing care Plan						
• Initiated	At 1 st visit					
• Documented	Monthly					
• <u>Tox</u> Checks	Monthly or PRN					



Monthly Monitoring

Weight

Pregnancy (if applicable)

Audiogram/vestibular screen if on aminoglycoside/ capreomycin

Vision screen if on ethambutol, rifabutin, linezolid, clofazimine



Consider CXR:

- Month 3
- Month 6
- Month 12
- Month 18
- Month 24

Consider CT:

- Month 12
- Month 24

Physician Assessment

After the initial Physician Assessment:

- Every 1-2 weeks
- Monthly after the 3rd month



Laboratory Monitoring

CBC, BUN, Creatinine, Liver Function Tests, potassium, calcium, magnesium monthly

Hgb A1C (every 3-6 months)

TSH (on Ethionomide and/or PAS) every 3 months



Sputum

CULTURE

Every month (preferably early morning specimens) x 3 for duration of treatment



DRUG SUSCEPTIBILITY

Request drug susceptibility if sputum positive at month 2

Repeat every month if culture remains positive

Antituberculosis medications

Amikacin

Amoxicillin

Bedaquiline

Capreomycin

Clarithromycin

Clofazimine

Cycloserine

Delamanid

Ethambutol

Ethionamide

Imipenem/cilastatin

Isoniazid

Kanamycin

Levofloxacin

Linezolid

Meropenem

Moxifloxacin

Pyrazinamide

Para-aminosalicylate

Rifabutin

Rifampin

Rifapentine

Streptomycin



Drug Toxicity

General Principles

- Counsel every patient
- Measures to minimize toxicity
 - Supplemental ancillary medication (address common side effects)
 - Non-pharmaceutical approaches
 - Change in time of dose
 - Dose some meds with food
 - Relaxation techniques

Routine toxicity monitoring

- Screen for bone marrow suppression (CBC for linezolid)
- Monitor renal function (creatinine monthly for those on aminoglycosides or capreomycin)
- Monitor liver function (monthly for PZA, ETA, PAS)
- Monitor serum electrolytes (K⁺, Ca⁺, Mg for aminoglycosides and CM)
- Screening for hypothyroidism (TSH every 3 months for ETA or PAS)

Routine Toxicity Monitoring

- Screen for bone marrow suppression (CBC for linezolid)
- Monitor renal function (creatinine monthly for those on aminoglycosides or capreomycin)
- Monitor liver function (monthly for PZA, ETA, PAS)
- Monitor serum electrolytes (K⁺, Ca⁺, Mg for aminoglycosides and CM)
- Screening for hypothyroidism (TSH every 3 months for ETA or PAS)
- Screening for hearing loss and vestibulopathy
- Screening for visual changes (EMB, LZD, CFZ)
- EKG (BDQ)
- Screening for peripheral neuropathy (LZD, FQ, high dose INH)
- Screening for depression, agitation and psychosis (CS)

Nursing Considerations

Nursing Guide for **Managing Side Effects** to Drug-resistant TB Treatment

Nurses are frequently the first point of contact a patient will have when seeking health care and are the main cadre of health professionals worldwide delivering and/or overseeing a patient's daily directly observed treatment.

Nurses are often the first to hear of a patient's side effect(s) during TB treatment and therefore, are well positioned to intervene



International Council of Nurses
The global voice of nursing



CURRY
INTERNATIONAL
TUBERCULOSIS
CENTER

UCSF
University of California
San Francisco

Stop TB Partners
TB REACH

Clinical Monitoring

Instruct patient to report any signs or symptom of a potential adverse drug reaction:

- Fever
- Headache
- Rash
- Nausea, vomiting, diarrhea, abdominal pain
- Fatigue or weakness
- Cardiac dysrhythmias
- Dark urine
- Persistent numbness in hands or feet
- Joint or muscle pain/tendon inflammation
- Vision changes
- Hearing loss
- Tinnitus
- Mood changes, sleep disturbances
- Suicidal thoughts

Tool 4: Laboratory Flow Sheet

	DATE:									
HEME	WBC									
	Hgb/Hct									
	Platelets									
Chemistry	Na+									
	K+									
	Cl-									
	CO ₂									
	Ca++									
	Mg++									
	Total Bili									
	Glucose									
	BUN									
	Creatinine									
	Uric Acid									
	Alk Phos									
	AST (SGOT)									
	ALT (SGPT)									
	T. Protein									
	Albumin									
	ABG	PH								
PaO ₂										
PaCO ₂										
HCO ₃										
O ₂ Sat										
Urine	Spec. Gravity									
	pH									
	Ketone									
	Glucose									
	Protein									
	Heme									
Other	Cr Clearance									
	TSH									
	PT/PTT									
	HgbA1C									
	CD4									
	Viral Load									
Drug Levels	Pregnancy									

Tool 5: Vision Screening Flow Sheet

Visual acuity chart used (type and distance e.g., 10 or 20 foot): _____

Color discrimination tool used (type and number of plates if applicable): _____

BASELINE RESULT						
Date	VISUAL ACUITY		COLOR VISION		Performed by (signature)	Comment or action
	Right eye	Left eye	Right eye	Left eye		
	___/___	___/___				

MONTHLY MONITORING						
Date	VISUAL ACUITY		COLOR VISION		Performed by (signature)	Comment or action
	Right eye	Left eye	Right eye	Left eye		
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
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	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				
	___/___	___/___				

NOTE: If changes from baseline noted during monthly screening, inform treating clinician and refer for further evaluation.

Hearing and Vestibular Screening Flow Sheet

NOTE: If changes from baseline noted during monthly screening, inform treating clinician and refer for further evaluation.

Date	Change in hearing, ringing or fullness in ears?	Dizzy, weak or unsteady?	Romberg	Walking	Heel-to-Toe Walk	Audiogram		Signature	Comment/Action
						Left	Right		
Baseline	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		
	Left ear: Y / N Right ear: Y / N	Yes / No	Normal Loss of balance	OK Weaves Staggers	Does well Jerky Hesitates Sways	WNL Abn Stable	WNL Abn Stable		

Nursing Interventions

Seek urgent medical evaluation

- Drug may be started at a lower dose and gradually increased
- Change in time administration/spacing the medication
- Medication may be ordered (Phenergan, Zofran, Reglan)
- Light snack
- Hydration
- Treat gastritis or acid reflux
- Stop meds

Counsel the patient

- Some side effects
- Maintain good hydration and nutrition
- Avoiding alcohol

Discuss with MD

- Treat underlying causes, if any
- Refer to specialist

Principles of Treatment and Management of MDR-TB

Consult with a DSHS-recognized TB Medical Specialist (Dr. Seaworth, Dr. Armitige, Dr. Starke)

An initial period of hospitalization is helpful

Prior TB treatment history is extremely important

If not already done, implement location appropriate isolation

Intervene quickly when toxicity develops



Principles of Treatment and Management of MDR-TB

Monitor and respond quickly to clinical toxicity

CBC, LFTs, TSH, creatinine, calcium

Audiological evaluation

Vestibular toxicity screen

Visual screen

Nutritional assessment

Drug levels

Patient Centered Care.....

Changing: engage patients as active participants in their care

Emphasizing tailored treatment to address both patient's clinical and social concerns

Providing care that is respectful of and responsive to individual patient preferences, needs and values, and ensuring that patient values guide clinical decisions

Training (clinical care teams) to be more mindful, informative, and empathetic to transform their role from one characterized by authority to one that has the goals of partnerships, solidarity, empathy, and collaboration



TB Patient Centered Care...

Patient is assigned a nurse case manager (NCM) to assess the needs and barriers that may interfere with treatment adherence

NCM develops individualized “Case Management Plan” with interventions to address needs and barriers

Plan is reviewed and revised as needed

Involving patient and family meaningfully when making decisions regarding treatment and overall care

Get to Know Your Patient

Develop a good relationship with your patient

- Use effective communication skills
- Find common ground
- Be respectful and empathetic

Educate, educate, educate!

Find out their perceptions and knowledge of TB

Who is their support system? Do they know and understand about TB and treatment?

Do they have social or cultural influences-alcohol, drugs, alternative treatment, holistic medicinal practices

Understand your patient's home/work habits, routines

Language barriers need to be addressed

Discuss health beliefs and misconceptions

LISTEN, be open-minded, recognize patient fears, avoid criticizing, be consistent



Responsibility for Successful Treatment

Successful TB treatment is primarily the responsibility of medical providers and health care workers; NOT the patient

It is strongly recommended that the initial treatment strategy utilize patient-centered case management with an adherence plan that emphasizes direct observation of therapy (DOT)

DOT is significantly associated with improved treatment success (the sum of patients cured and patients completing treatment) and with increased sputum smear conversion during treatment, as compared to self administered treatment (SAT)

- Early recognition of adverse drug reactions
- Allow for establishing rapport with patients and families
- Addressing treatment complications expeditiously
- Remains standard practice in US





Today I am Sad.....

Because your eyes have lost their luster, hope was not accomplished, your voice was silenced, your smile extinguished, your steps stopped. Today a battle was lost, a heart departed sad for lack of love. You were only 16 years old.

At your young age, you knew fear, heartbreak, pain, and illness. But above all, the need of so many spiritual, emotional and material things.

For the time I treated you, you smiled, you felt hope, and joy was born. You had the want to live although it was late and your time came to an end.

I hope that wherever you are, you are happy. I hope that you receive the eternal embrace of love. Smile. Open your eyes and enjoy what this life was incapable of giving you.

Your nurse, Karla



“Let no one ever come to
you without leaving better
& happier.
Be the living expression of
God’s kindness:
Kindness in your face,
kindness in your eyes,
kindness in your smile.”

MOTHER
TERESA



Self Care for TB Nurses

Get a pedi every 2 weeks

Buy yourself morning coffee

Spend your days off in nature

Sit on the toilet at work for 10 minutes if you need a mental break

Pack a healthy lunch and EAT IT!

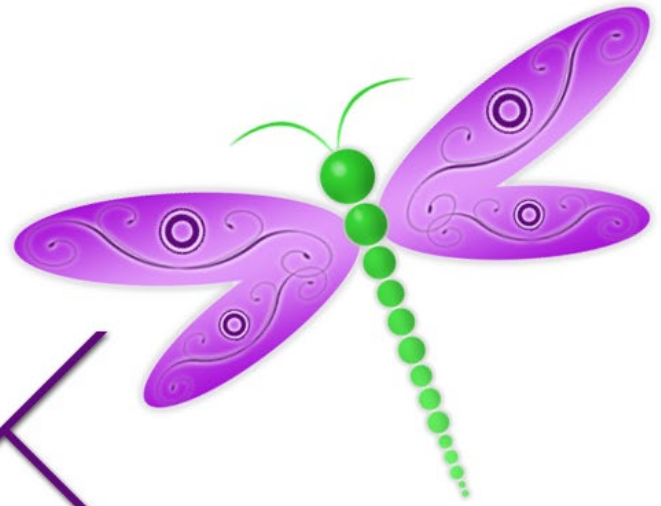
Take a fitness class

Start a journal

Listen to your mind and body and respond accordingly

Start reading a good book for fun or self-improvement

THANK
YOU . . .



References

Schlossberg, D. (2017). *Tuberculosis and Nontuberculous Mycobacterial Infections, Seventh Edition*. Washington, D. C.:ASM Press

Curry International Tuberculosis Center and California Department of Public Health. (2018). *Nursing Guide for Managing Side-Effects to Drug-resistant TB treatment*.

Heartland National TB Center-MDR TB Care Plan

Curry International Tuberculosis Center and California Department of Public Health. (2016). *Drug-Resistant Tuberculosis: A Survival Guide for Clinicians, Third Edition*. Retrieved from

https://www.currytbcenter.ucsf.edu/sites/default/files/tb_sg3_book.pdf