International Journal of Pharmacy and Chemistry
2022; 8(2): 20-23
http://www.sciencepublishinggroup.com/j/ijpc
doi: 10.11648/j.ijpc.20220802.11
ISSN: 2575-5730 (Print); ISSN: 2575-5749 (Online)

First Line Anti-tuberculosis Medication for Pregnant Women

Gudisa Bereda

Department of Pharmacy, Negelle Health Science College, Guji, Ethiopia

Email address:
gudisabareda95@ gmail.com

To cite this article:
Gudisa Bereda. First Line Anti-tuberculosis Medication for Pregnant Women. *International Journal of Pharmacy and Chemistry.* Vol. 8, No. 2, 2022, pp. 20-23. doi: 10.11648/j.ijpc.20220802.11

Received: December 31, 2021; **Accepted**: January 22, 2022; **Published**: April 14, 2022

Abstract: Tuberculosis is more sophisticated to diagnose in pregnant women contract the diseases because tuberculosis clinical manifestations suchlike tiredness, difficulty of breathing, sweating, weakness, coughing, and rare body temperature that is higher than normal are identical to the physiology of pregnant women changed during pregnancy. According to the United States food and drug administration risk classification of medicines among pregnancy; the four first line anti-tuberculosis medications are classified as category B and category C. The 1st line regimen management for pulmonary and extrapulmonary tuberculosis does not distinctive during pregnant and nonpregnant women. The WHO recommends 8 weeks of isoniazid, rifampicin, pyrazinamide, and ethambutol for intensive phase, followed by 16 weeks of isoniazid and rifampicin for continuation phase. This regimen is safe to use during pregnancy. Rifampicin is a category C medicine. Bleeding differentiated to hypoprothrominemia has been reported in child less than 1 year and mother following the usage of rifampicin in pregnancy period begins at 28 weeks until birth. The usage of rifampicin is recommended for pregnant women with vitamin K for management tuberculosis, should be given to the breastfeeding women and the child less than 1 year postnatal if rifampicin is given to the pregnant mother in the last few weeks. Ethambutol is pregnancy class B medicine. Ethambutol highly concentrated in fetus plasma concentration which can be as high as thirty percent of the plasma concentration of drugs in mother because ethambutol easily crosses the placental barrier. Ethambutol freely crosses the placenta with a cord to maternal serum ratio of 0.75.

Keywords: Anti-tuberculosis Medication, First Line, Pregnant Women

1. Introduction

Tuberculosis not only responsible for an important percentage of the over the broad load of disease, it is also an important contributor to maternal mortality, with the disease being among the 3 leading causes of death amid women aged 15–45 yrs [1, 2]. When pregnant women contract tuberculosis, the disease is further sophisticated to diagnose because TB symptoms such as fatigue, shortness of breath, sweating, tiredness, cough, and mild fever are identical to physiological symptoms of pregnancy. Unmanaged tuberculosis or tuberculosis managed late perhaps influence to serious outcomes leading both mother and children. Pregnant women with PTB who are managed accordingly do not have escalated rates of maternal or neonatal complications, while without management; tuberculosis can influence to escalated neonatal morbidity, LBW, prematurity, and escalated pregnancy complications, involving 4 times escalates in maternal morbidity owing to greater rates of abortion, postpartum haemorrhage, labour difficulties, and pre-eclampsia [3-5]. The consequences of tuberculosis on pregnancy perhaps be affected by multiple factors, like severity of the disease, how developed the pregnancy has gone at the time of diagnosis, the presence of extrapulmonary spread, and human immuno virus coinfection and the management instituted. The pulmonary and extrapulmonary forms of tuberculosis effects pregnant women in the identical path as the nonpregnant ones. If ATT is launched early in pregnancy, the consequences is identical as that in nonpregnant patients, whereas late diagnosis and care are associated with four-times escalate in obstetric morbidity and nine times escalate in pre-term labor [6]. The escalated vulnerability to tuberculosis may be due to immunological changes in pregnancy. Pregnancy partially inhibits the T-

helper 1 (Th1) cell mediated immunity, in favours of the antibody response (Th2 mediated), maybe to keep the fetus from immunological rejection. Cell-mediated immunity has the preeminent function in safeguard against MTB and active TB is associated with a greatest Th2 immune response [7, 8]. According to the USFDA risk classification of medicines among pregnancy the four first line anti-tuberculosis medications are classified as category B and category C. Solely ethambutol is category B, the left three (rifampicin, isoniazid, and pyrazinamide) are category C. The medication currently phase-out from market streptomycin is category D. It has been confirmed to be potentially teratogenic throughout pregnancy. It causes fetal deformity and 8th-nerve paralysis, with deficits scaling from mild hearing loss to bilateral deafness. Explanation of category B and C is illustrated below. Category B (no confirmation of pitfall in humans): Either animal-reproduction studies have not substantiated a fetal peril but there are no restrained studies in pregnant women or animal-reproduction studies have reveal an adverse reaction (other than a de-escalate in fertility) that was not inveterate in restrained studies in women in the first trimester (and there is no confirmation of a pitfall in later trimesters) or there is survey in animal that revealed the medication is safe in pregnant animal, but there is no fetal pitfall confirmation in pregnant women. Medications in this class are typically thought-out safe [9-14]. Category C (pitfall can't be ruled out): Either studies in animals have displayed adverse effects on the fetus (teratogenic or embryocidal, or other) and there are no restrained studies in women or studies in women and animals are not avail. Medications should be accustomed only if the potential advantage maintains the potential peril to the fetus or the survey in animal model displayed slight pitfall to the pregnant animal, but there is no confirmation in fetal peril of human survey in pregnant women [15-17]. The intentions of this review article is to distinguish safety and United States food and drug administration pregnancy category of first line anti-tuberculosis medication utilization during pregnancy by pregnant women with tuberculosis infections and also its risks on fetus if crosses placental barriers.

2. Regimens and Category of Anti-tuberculosis Medication Is Pregnant Mother

All four first line anti-tuberculosis medications have good safety documentation in pregnancy and are not associated with human fetal deformity. The 1st line management for pulmonary and extrapulmonary TB does not distinctive during pregnant and nonpregnant women. The World Health Organization recommends 8 weeks of isoniazid, rifampicin, pyrazinamide, and ethambutol (2RHZE) in intensive phase, followed by 16 weeks of isoniazid, and rifampicin (4RH). This regimen is safe to usage during pregnancy [7, 18]. Rifampicin is a category C medicine. Bleeding characterized to hypoprothrominemia has been reported in child less than 1 year and mothers following the usage of rifampicin in late pregnancy. The usage of rifampicin is described in pregnant women with tuberculosis, with the recommendation that vitamin K be given to both the mother and the child less than 1 year postpartum if rifampicin is used in the last few weeks of pregnancy [7, 19]. Isoniazid is a category C Medicine. Isoniazid usage during pregnancy is thought out as safe. Isoniazid has the ability to highly soluble in lipid, a LMW, and crosses the placenta easily to reach fetal levels identical to those of the mother [7]. However, there is a peril of advancing hepatitis in the postpartum period. The WHO recommends that entire pregnant women taking isoniazid also receive pyridoxine (25-50 mg/day) because isoniazid raises excretion of pyridoxine which reduced by administration of pyridoxine (vitamin B6). Neonates born to mothers who have been under management with isoniazid are at pitfall of advancing convulsive seizures because pyridoxine deficiency perhaps causes seizures in the newborn [20-22]. Ethambutol is a category B medicine. Ethambutol crosses the PB, and the plasma concentration of E in the fetus can be as much as 30% of the plasma concentration of the medicine in the mother. Ethambutol freely crosses the placenta with a cord to maternal serum ratio of 0.75 [23]. The World Health Organization thought out it safe to use ethambutol amid pregnancy without any particular cautions. High therapeutic doses of ethambutol in child less 28 days or child less than 1 year if totally discouraged, because of eye toxicity concerns and the availability of better management alternative, but its usage in pregnancy is not discouraged [19, 24]. Pyrazinamide is a category C medicine. The World Health Organization thought out it safe to use pyrazinamide during pregnancy [19, 25, 26]. Its usage is specifically described in women with tuberculos meningitis in pregnancy, human immuno virus coinfection, and suspected isoniazid resistance [27-29].

3. Conclusion

If PTB in pregnancy are managed accordingly there is no escalated the complications maternal or neonatal rates, while there is no proper management; tuberculosis can influence to escalated the morbidity of neonate, LBW, fetus born before the normal time, and escalated the complications occurred during pregnancy, involving four times escalates the morbidity of mother owing to greater occurrences of abortion, postpartum hemorrhage, labour complications, and preeclampsia. Category C (pitfall can't be ruled out): Either studies in animals have displayed adverse effects on the fetus (teratogenic or embryocidal, or other) and there are no restrained studies in women or studies in women and animals are not avail. Drugs should be accustomed only if the potential advantage maintains the potential peril to the fetus or the survey in animal model displayed slight pitfall to the pregnant animal, but there is no confirmation in fetal peril of human survey in pregnant women. Isoniazid is a category C drug. H has the ability to highly soluble in lipid, a LMW, and crosses the placenta easily to reach fetal levels identical to

those of the mother [7]. Notwithstanding, there is a peril of advancing liver impairment in the postnatal period. The World Health Organization recommended that all women who are pregnant are taking isoniazid also receive pyridoxine or vitamin B6 (25-50 mg/day) because isoniazid raises excretion of pyridoxine which reduced by administration of pyridoxine (vitamin B6). A child less than 28 days born from pregnant women who received isoniazids for management of tuberculosis are at risk of advancing convulsive seizures or infantile spasm.

Abbreviations

ATT: anti-TB treatment; H: Isoniazid; LBW: Low birth weight; LMW: Low molecular weight; MTB: Mycobacterium tuberculosis; PB: Placental barrier; PTB: Pulmonary tuberculosis; R: Rifampicin; Z: Pyrazinamide; USFDA: United States food and drug administration; WHO: World Health Organization.

Acknowledgements

The author would be grateful to anonymous reviewers by the comments that increase the quality of this manuscript.

References

[1] O. M. Loto and I. Awowole. Tuberculosis in Pregnancy: A Review. Journal of Pregnancy Volume 2012, Article ID 379271, 7 pages doi: 10.1155/2012/379271.

[2] "2010/2011 tuberculosis global fact; World Health Organisation," http://www.who.int/tb/country/en/index.html, Nov. 2010.

[3] Nguyen HT et al. Tuberculosis care for pregnant women: a systematic review. BMC Infectious Diseases 2014, 14: 617. http://www.biomedcentral.com/1471-2334/14/617.

[4] Bergeron KG, Bonebrake RG, Allen C, Gray CJ: Latent tuberculosis in pregnancy: screening and treatment. Curr Womens Health Reports 2003, 3: 303–308.

[5] Nhan-Chang CL, Jones TB: Tuberculosis in pregnancy. Clin Obstet Gynecol 2010, 53: 311–321.

[6] Rai DK. Tuberculosis in pregnancy. East J Med Sci. 2016; 1 (2): 42-45.

[7] Repossi AC, Bothamley GH. Tuberculosis and pregnancy: an updatedsystematic review. Pulm Res Respir Med Open J. 2015; 2 (1): 63-68. doi: 10.17140/PRRMOJ-2-109.

[8] Bothamley GH. Screening for tuberculosis in pregnancy. Expert. Rev. Obstet. Gynecol. 2012; 7 (4): 387-395.

[9] Bedewi N, Sisay M, Edessa D. Drug utilization pattern among pregnant women attending maternal and child health clinic of tertiary hospital in eastern Ethiopia: Consideration of toxicological perspectives. BMC Res Notes. 2018; 11: 858.

[10] Kaplan YC. Drug use and/or exposure in pregnancy: Presence of risk versus quantity of risk. J Turkish Ger Gynecol Assoc. 2015; 16 (2): 123– 123.

[11] Whitehouse Station, New Jersey: Merck; 2016. Available at: www.merck.com/product/usa/pi_circulars/z/zepatier/zepatier_pi.pdf. Accessed February 13, 2016.

[12] Yondelis (trabectedin) prescribing information. Horsham, Pennsylvania: Janssen Biotech; 2015. Available at: www.yondelis.com/prescribing-information.pdf. Accessed February 13, 2016.

[13] Beroukhim K, Abrouk M, Farahnik B. Impact of the Pregnancy and Lactation Labeling Rule (PLLR) on practicing dermatologists. Dermatol Online J 2015; 21 (11). pii: 13030/qt46c4m2tw.

[14] Veiby G, Daltveit AK, Schjølberg S, Stoltenberg C, Øyen AS, Vollset SE, Engelsen BA, Gilhus NE. Exposure to antiepileptic drugs in utero and child development: a prospective population-based study. Epilepsia. 2013; 54 (8): 1462–72.

[15] Gilboa SM, Broussard CS, Devine OJ, Duwe KN, Flak AL, Boulet SL, Moore CA, Werler MM, Honein MA. Influencing clinical practice regarding the use of antiepileptic medications during pregnancy: modeling the potential impact on the prevalences of spina bifida and cleft palate in the United States. Am J Med Genet C: Semin Med Genet. 2011; 157C (3): 234–46.

[16] Viguera AC, Whitfield T, Baldessarini RJ, Newport DJ, Stowe Z, Reminick A, Zurick A, Cohen LS. Risk of recurrence in women with bipolar disorder during pregnancy: prospective study of mood stabilizer discontinuation. Am J Psychiatry. 2007; 164 (12): 1817–24. quiz 1923.

[17] Harden CL, Hopp J, Ting TY, Pennell PB, French JA, Hauser WA, et al. Practice parameter update: management issues for women with epilepsy--focus on pregnancy (an evidencebased review): obstetrical complications and change in seizure frequency: report of the Quality Standards Subcommittee and Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and American Epilepsy Society. Neurology 2009; 73 (2): 126–32. 8.

[18] World Health Organization. Treatment of tuberculosis guidelines. 4th edition, 2010. http://whqlibdoc.who.int/publications/2010/9789241547833_eng.pdf?ua=1. Accessed September 12, 2014.

[19] Arbex MA, Varella MCL, Siqueira HR et al. Antituberculosis drugs: Drug interactions, adverse effects, and use in special situations. Part 1: First-line drugs. J Bras Pneumol. 2010; 36 (5): 626-640.

[20] Blumberg HM, Burman WJ, Chaisson RE, Daley CL, Etkind SC, Friedman LN, et al. American Thoracic Society/ Centers for Disease Control and Prevention/Infectious Diseases Society of America: treatment of tuberculosis. Am J Respir Crit Care Med. 2003; 167 (4): 603-62.

[21] World Health Organization. Treatment of Tuberculosis: Guidelines for National Programmes. Geneva: World Health Organization; 2003.

[22] Nardiello S, Pizzella T, Ariviello R. Risks of antibacterial agents in pregnancy [Article in Italian]. Infez Med. 2002; 10 (1): 8-15.

[23] Ormerod P. Tuberculosis in pregnancy and the puerperium. Thorax 2001; 56: 494–499.

[24] World Health Organization. The Treatment of Tuberculosis Guidelines. Geneva: World Health Organization; 2010.

[25] Rakotoson JL, Randriamanana D, Rakotomizao JR, Andrianasolo R, Rakotoarivelo R, Andrianarisoa AC. Severe systemic lupus erythematosus induced by isoniazid [Article in French]. Rev Pneumol Clin. 2009; 65 (6): 361-4.

[26] Brasil. Ministério da Saúde. Fundação Nacional de Saúde. Centro de Referência Professor Hélio Fraga; Sociedade Brasileira de Pneumologia e Tisiologia. Controle da tuberculose: uma proposta de integração ensino-serviço. Rio de Janeiro: FUNASA/CRPHF/SBPT; 2002.

[27] H. M. Blumberg, W. J. Burman, R. E. Chaisson et al., "American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America: treatment of tuberculosis," American Journal of Respiratory and Critical Care Medicine, vol. 167, no. 4, pp. 603–662, 2003.

[28] Anon, "Treatment of tuberculosis," MMWR Recommendations and Reports, vol. 52, pp. 1–77, 2003.

[29] J. G. Bartlett, "Guidelines section," Infectious Diseases in Clinical Practice, vol. 11, pp. 467–471, 2002.