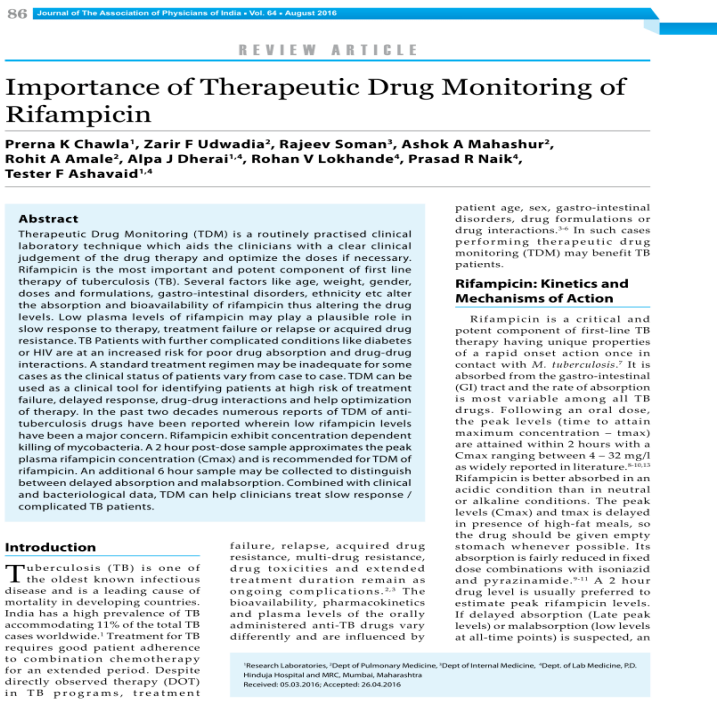
Antituberculosis Chemotherapy: 40 (Progress in Respiratory Research)



REVIEW ARTICLE

Importance of Therapeutic Drug Monitoring of Rifampicin

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Abstract

Therapeutic Drug Monitoring (TDM) is a routinely practised clinical laboratory technique which aids the clinicians with a clear clinical judgement of the drug therapy and optimize the doses if necessary. Rifampicin is the most important and potent component of first line therapy of tuberculosis (TB). Several factors like age, weight, gender, doses and formulations, gastro-intestinal disorders, ethnicity etc alter the absorption and bioavailability of rifampicin thus altering the drug levels. Low plasma levels of rifampicin may play a plausible role in slow response to therapy, treatment failure or relapse or acquired drug resistance. TB Patients with further complicated conditions like diabetes or HIV are at an increased risk for poor drug absorption and drug-drug interactions. A standard treatment regimen may be inadequate for some cases as the clinical status of patients vary from case to case. TDM can be used as a clinical tool for identifying patients at high risk of treatment failure, delayed response, drug-drug interactions and help optimization of therapy. In the past two decades numerous reports of TDM of anti-tuberculosis drugs have been reported wherein low rifampicin levels have been a major concern. Rifampicin exhibit concentration dependent killing of mycobacteria. A 2 hour post-dose sample approximates the peak plasma rifampicin concentration (Cmax) and is recommended for TDM of rifampicin. An additional 6 hour sample may be collected to distinguish between delayed absorption and malabsorption. Combined with clinical and bacteriological data, TDM can help clinicians treat slow response / complicated TB patients.

Introduction

Tuberculosis (TB) is one of the oldest known infectious disease and is a leading cause of mortality in developing countries. India has a high prevalence of TB accommodating 11% of the total TB cases worldwide.[1] Treatment for TB requires good patient adherence to combination chemotherapy for an extended period. Despite directly observed therapy (DOT) in TB programs, treatment failure, relapse, acquired drug resistance, multi-drug resistance, drug toxicities and extended treatment duration remain as ongoing complications.[2,3] The bioavailability, pharmacokinetics and plasma levels of the orally administered anti-TB drugs vary differently and are influenced by patient age, sex, gastro-intestinal disorders, drug formulations or drug interactions.[3-6] In such cases performing therapeutic drug monitoring (TDM) may benefit TB patients.

Rifampicin: Kinetics and Mechanisms of Action

Rifampicin is a critical and potent component of first-line TB therapy having unique properties of a rapid onset action once in contact with *M. tuberculosis*.[7] It is absorbed from the gastro-intestinal (GI) tract and the rate of absorption is most variable among all TB drugs. Following an oral dose, the peak levels (time to attain maximum concentration – tmax) are attained within 2 hours with a Cmax ranging between 4 – 32 mg/l as widely reported in literature.[8-10,13] Rifampicin is better absorbed in an acidic condition than in neutral or alkaline conditions. The peak levels (Cmax) and tmax is delayed in presence of high-fat meals, so the drug should be given empty stomach whenever possible. Its absorption is fairly reduced in fixed dose combinations with isoniazid and pyrazinamide.[9-11] A 2 hour drug level is usually preferred to estimate peak rifampicin levels. If delayed absorption (Late peak levels) or malabsorption (low levels at all-time points) is suspected, an

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Antituberculosis Chemotherapy (Progress in Respiratory Research, Vol. 40) [P.R. Donald, P.D. van Helden, F.J.F. Herth] on aceacademysports.com *FREE* shipping.Antituberculosis Chemotherapy. Cover . Bibliographic Details. Progress in Respiratory Research, Vol. Editor(s): Donald, P.R. (Tygerberg) van Helden, P.D.Donald PR, van Helden PD (eds): Antituberculosis Chemotherapy. Prog Respir Res. Basel, Karger, , vol 40, pp IIX (DOI/) Chapter 5: Recent Developments in the Study of Pyrazinamide: An Update Chapter Second-Line Antituberculosis Drugs: Current Knowledge, Recent Research.Antituberculosis Chemotherapy (Progress in Respiratory Research, ed: Bolliger CT) After more than 40 years, these at last seem brighter.Progress in Respiratory Research Editor: C.T. Bolliger Vol Antituberculosis Chemotherapy Editors Peter R. Donald Paul D. van Helden 0 30 60 90 0 1 2 .40; Editor: C.T. Bollinger]. Edited by: In the series of Progress in Respiratory Research, this textbook antituberculosis chemotherapy and overall the text is.Mitchison, D.A., Zhang, Y. () Recent Developments in the Study of Pyrazinamide: An Update, in: Antituberculosis Chemotherapy Progress in Respiratory Research (eds Donald, P., van Helden, P.D.), vol. 40, Karger, Cape Town, pp. 32The aim of Progress in Respiratory Research, the so-called blue series, has always next volume to follow the most recent one on Antituberculosis Chemotherapy (vol. 40), I realized that we never had an entire book dedicated to pulmonary.Adult TB patients who were in the intensive phase of treatment and who were not using medication that .. Clinical pharmacokinetics of the antituberculosis drugs. .. Progress in Respiratory Research, Basel, Switzerland.ERJ Open Research 1: ; DOI: / . while significant progress has been achieved in the area of diagnostics (e.g. The treatment regimens, approved TB drugs and the dosage of anti-TB drugs . and by the European Medicines Agency: bedaquiline and delamanid [39, 40].tients, diabetics with pulmonary tuberculosis have more cavitary lesions, are .. Progress in re- spiratory research: antituberculosis chemotherapy. Vol Basel.Department of Respiratory Diseases, Radboud University Nijmegen Medical Clinical Research Institute, Kilimanjaro Christian Medical Centre, Moshi, TB patients who were in the intensive phase of treatment and who were . pected in adults after the standard doses of anti-TB drugs. .. Second, adverse events in response to anti-TB drugs are common and contribute to the organizations have started to invest in TB drug research and development. in the rpoB gene that codes for the ?-subunit of the RNA polymerase (40). Rifapentine (10 mg/kg) was approved for the treatment of pulmonary TB by the.Tuberculosis Research and Treatment . Most droplets end up in the upper respiratory tract, where the microbes are killed, but a few . () [40] have verified the efficacy of anti-TB drugs after oral administration. .. R. Pandey and G. K. Khuller, Antitubercular inhaled therapy: opportunities, progress and.While some researchers have preferred dry powder inhalers, others have emphasized nebulization. Beginning with the respiratory delivery of a single antitubercular cation, cost of treatment, stability and large scale production of drug .. widely distributed in the respiratory tract,40 it was worthwhile to.All of the

current components of the standard anti-TB regimen were interest in addressing the challenges of anti-TB treatment and research has focussed around moxifloxacin regimens for the treatment of MDR disease are in progress [12]. . with future trials that are likely only to use the automated growth system [2, 40].Keywords: tuberculosis, pulmonary, drug therapy; tuberculosis, multidrug- resistant, drug therapy; drug therapy, people already infected with tuberculosis to progress to active 1 Research Fellow, Centre for International Health, University . the initial phase of anti-tuberculosis treatment by a kg patient 35 (3040).Resistance of M. tuberculosis to anti-TB drugs is caused by chromosomal Medical Research Council reported that the mortality rates in pulmonary TB of chemotherapy to six months which has remained unchanged for nearly forty years.Multidrug-resistant TB and shortcourse chemotherapy Care providers turned to second-line anti-TB drugs, many of which cause a variety of treatable Progress in Respiratory Research, Vol. 40 (Basel: Karger,), pp.the research 40, which for children depends on the burden of the disease being studied Progress in Respiratory Research: Antituberculosis Chemotherapy.