ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 11 | November - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EFFECTIVENESS OF ISONIAZID PREVENTIVE THERAPY ON INCIDENCE OF TUBERCULOSIS AMONG PEOPLE LIVING WITH HIV IN SOUTHERN MAHARASHTRA

General Medicine

Dr. Yagnesh Dhiren Doshi* Senior Resident, Department Of General Medicine, Government Medical College and Hospital, Miraj, Sangli, Maharashtra. *CorrespondingAuthor

Dr. Basavaraj Anita Professor And Head, Department Of General Medicine, Government Medical College and Hospital, Miraj, Sangli, Maharashtra.

ABSTRACT

Tuberculosis being the foremost opportunistic infection associated with Human Immunodeficiency Virus infection contributes to high morbidity and mortality among HIV seropositive persons. As per World Health Organisation TB statistics for 2020, and the India TB Report 2021- The incidence of TB cases including HIV in India was 193 per 100000 population, of which mortality was 32 per 100000 cases. Isoniazid Preventive Therapy reduces the reactivation of latent Tuberculosis infection and reduces the risk of acquiring TB by 70-90% among HIV co-infected individuals. WHO recommends use of ART and Isoniazid Preventive Therapy (IPT) combination to reduce the burden of TB among HIV infected patients. Considering the benefits of IPT in PLHIV patients, this study was conducted over a period of 2 years from January 2020 to December 2021 in patients attending ART OPD of a tertiary care hospital in southern Maharashtra. **Methods** A prospective observational study was conducted on patients attending ART OPD along with General Medicine OPD at a tertiary care hospital from January 2020 to December 2021. A total of 1497 PLHIV patients were started on IPT during this period and followed up. **Results** 92.18% i.e. 1380 of 1497 patients completed 6 months of IPT with remaining 7.82% i.e. 117 patients not able to complete the entire 6 months due to treatment related side effects, follow up difficulties or mortality. Of 1497 patients, only 2 patients (0.13%) developed Pulmonary Tuberculosis after initiation of IPT and the remaining didn't show any signs or symptoms of tuberculosis on follow up. **Conclusion** Results of IPT in PLHIV were highly effective with only 0.13% i.e. 2 patients developing Tuberculosis during the course of treatment with the remaining not having tuberculosis even on follow up or being reported till date. The results of the study along with other studies conducted worldwide clearly indicate the effectiveness of IPT in PLHIV and thereby its implementation should be further strengthened.

KEYWORDS

IPT, PLHIV, HIV, TB, MTB, ART, CD4.

INTRODUCTION

Tuberculosis is an infectious bacterial disease and a foremost opportunistic infection caused by Mycobacterium Tuberculosis (MTB), which is transmitted between humans through the respiratory route and most commonly affects the lungs, but can involve any tissue. The risk of progression to active tuberculosis after infection with tubercle bacilli is highest soon after the initial infection and increases severely for persons co-infected with immune-compromising conditions such as HIV.1

The WHO, Global Tuberculosis Control Report in 2010 showed that 9.4 million new TB cases were reported worldwide including the 1.1 million (11.7%) HIV co-infected cases. Eighty-five percent of these cases were reported in Asia and Africa: 55% and 30% respectively.2 The same report demonstrated that the mortality among 380,000 HIV co-infected individuals worldwide, were attributable to tuberculosis. According to Golub JE et al, the risk of tuberculosis recurrence in an HIV infected individual increases by 19 times due to re-infection or relapse.3

As per data from WHO , A total of 1.5 million people died from TB in 2020 (including 2,14,000 people with HIV). Worldwide, TB is the 13th leading cause of death and the second leading infectious killer after COVID-19 (above HIV/AIDS). In 2020, an estimated 10 million people fell ill with tuberculosis (TB) worldwide.4

As per the main sources of TB statistics - the World Health Organisation (WHO) TB statistics for 2020, and the India TB Report 2021- The incidence of tb cases including HIV in India was 193 per 100000 population, of which mortality was 32 per 100000 cases.4,5

Immunosuppression of any type is a predisposing factor for the development of tuberculosis. In persons co-infected with the tubercle bacillus and HIV, the overall annual risk of developing active tuberculosis rises from about 0.4% to 8%—that is, 20 times the risk.6 The risk depends, however, on the degree of immunosuppression—the risk of a patient with AIDS developing tuberculosis is 170 times higher than a non-immunosuppressed person. For these reasons, infection with HIV and M tuberculosis have been dubbed "the cursed duet".7

HIV and TB have a synergic effect.8 The increased incidence of active TB in HIV-infected individuals can be attributed to at least two mechanisms: the increased reactivation of latent TB or increased susceptibility to M. tuberculosis infection. The increased risk of active TB among HIV-infected persons was initially mainly attributed to an increased risk of reactivation of a latent infection; there is rapid progression to symptomatic disease in immunosuppressed HIV-infected individuals after de novo infection.9 As a result, tuberculosis is the leading cause of morbidity and mortality among PLHVs.10

In India, a TB-endemic country, most recurrences after successful treatment of TB are attributable to exogenous reinfection in HIV-infected persons but endogenous reactivation in HIV-uninfected persons.11

Although the hallmark of the HIV infection is the loss of CD4+ T cells, different cell populations are preferentially deleted at distinct periods of the HIV infection. During the initial period, the effector memory CD4+ T cells in the gut mucosa are preferentially depleted ,followed by the progressive generalized loss of naïve T cells.12,13 Innate and acquired components of the immune system become activated and fight viral infection. In the context of the acquired immune response, both HIV-specific B and T lymphocytes, and among these, both CD4+ and CD8+ T cells, become activated. HIV-2 infection also causes the activation of both B and T lymphocytes, although at a much slower pace, and as a consequence also causes a slower loss of CD4+ T cells and progression to AIDS.14 The activation of the T-cell population is such an important component of the HIV infection that it is recognized as a hallmark of pathogenic HIV infection. In fact, the level of immune activation is considered the best predictor of progression from HIV infection to AIDS and even to death, independently of HIV viral load.15

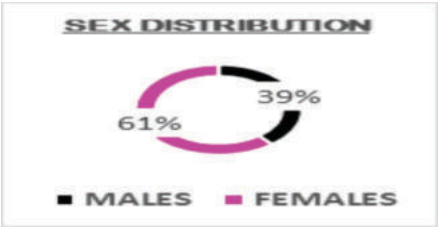
IPT reduces the reactivation of latent tuberculosis infection and reduces the risk of acquiring TB by 70-90% among HIV co-infected individuals.16,17 Individuals who are not enrolled on IPT or ART are considerably at higher risk of having new tuberculosis infection and reactivation of latent tuberculosis.18 World Health Organization (WHO) recommends use of ART and IPT combination to reduce the burden of TB among HIV infected patients.19

METHODOLOGY

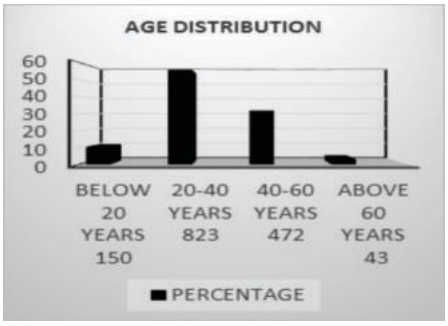
1. A Prospective Observational Study.
2. Approval by Ethics Committee for Academic Research Projects.
3. Informed consent obtained from each patient.
4. Patients attending the ART and General Medicine OPD of a

tertiary care hospital.
5. Study period of January 2020 to December 2021.
6. A total of 1497 PLHIV patients were started on IPT during this period and were included in the study with no exclusion criteria (e.g. Age,Sex,CD4 count, etc.)
7. Demographic statistics, details of IPT and outcome were charted in a Microsoft excel sheet and further analysed.
8. Follow up maintained for clinical examination.

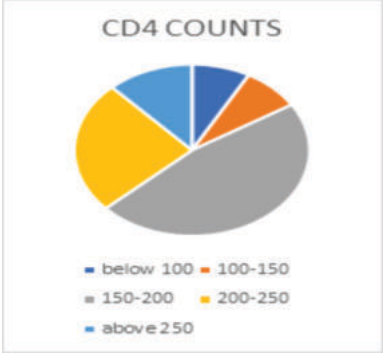
RESULTS



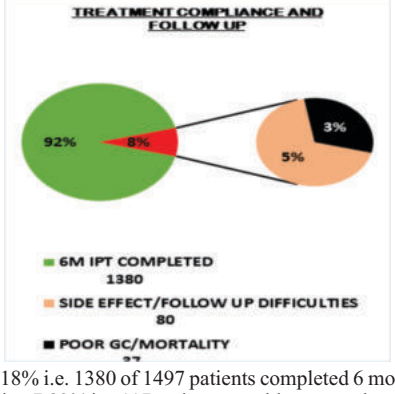
Of the 1497 patients included in the study, 61% (912) were females and 39% (585) being males.



150 patients were below 20 years of age, 823 patients of 20-40 years age group, 472 patients in 40-60 years of age group and 43 patients above 60 years of age. There was no difference in outcome of IPT in PLHIV with regards to age group as such.



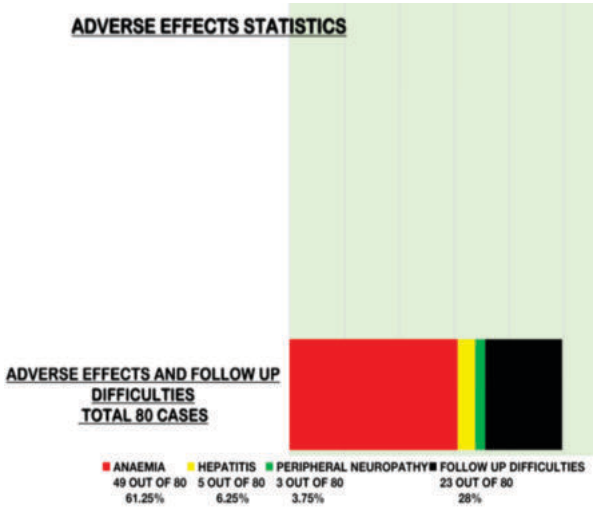
Majority of patients, 47.02% (704) had CD4 Count between 150-200 followed by 24.98% (374) patients with CD4 between 200-250. 11.89% (178) patients had CD4 Cell Count above 250. 8.08% (121) patients had CD between 100-150 and 8.01% i.e. 120 patients had CD4 below 100.



To note, 92.18% i.e. 1380 of 1497 patients completed 6 months of IPT with remaining 7.82% i.e. 117 patients not able to complete the entire 6 months due to treatment related side effects, follow up difficulties or mortality.

5.3% patients (80) had treatment related or other adverse effects thereby were stopped IPT before completing 6 months. Of these 80 patients, 49 patients developed severe anaemia, 5 patients had hepatitis and 3 patients developed peripheral neuropathy. Remaining 23 patients stopped treatment and were difficult to follow up cases. 2.4% i.e. 37 patients could not complete 6 months of IPT due to poor general condition and mortality.

Of the 5.3% patients (80), 49 patients developed severe anaemia, 5 patients had hepatitis and 3 patients developed peripheral neuropathy. Remaining 23 patients stopped treatment and were difficult to follow up cases.



It was noted that 61.05% patients (914) were on TLE regime, 33.06% (495) on TLD regime and 5.8% i.e. 88 patients were on ZLN regimen. Of 1497 patients, only 2 patients (0.13%) developed Pulmonary Tuberculosis after initiation of IPT on follow up and the remaining didn't show any signs or symptoms of tuberculosis over follow up.

CONCLUSION

Our tertiary care centre with ART OPD and General Medicine OPD saw a total 1497 PLHIV patients being initiated on IPT and followed up over January 2020 to December 2021.

COVID 19 Pandemic impacted the enrolment of IPT however IPT was made available during this period by local DTC.

It was observed that completion rate of IPT was high, side effect profile was minimal with good post-treatment protection against MTB. Thereby, after ruling out Tuberculosis, IPT should be offered to all PLHIVs, irrespective of their antiretroviral therapy status. Scaling-up of IPT services by active case identification, periodic counselling on adherence and training of ART staff with regards to treatment initiation, completion and follow up should be prioritized to reduce the TB burden in the community.

Results of IPT in PLHIV were highly effective with only 0.13% i.e. 2 patients developing Tuberculosis during the course of treatment with the remaining not having tuberculosis even on follow up or being reported till date.

The results of this study along with other studies conducted worldwide clearly indicate the effectiveness of IPT in PLHIV and thereby its implementation should be further strengthened.

Acknowledgement

The authors express a heartful gratitude towards the entire staff and doctors of ART OPD and General Medicine Department.

REFERENCES

1. Narayanan S, Swaminathan S, Supply P, Shanmugam S, Narendran G, Hari L, Ramachandran R, Locht C, Jawahar MS, Narayanan PR. 2010. Impact of HIV infection on the recurrence of tuberculosis in South India. J Infect Dis 201: 691–703.
2. World Health Organization. 2010b. Global Tuberculosis control: World Health Organization, Geneva: WHO press.

3. Golub, JE, Pronyk, P, Mohapi, L, Thsabangu, N, Moshabela, M, Struthers, H, Gray, GE, McIntyre, JA, Chaisson, RE and Martinson, NA. 2009. Isoniazid preventive therapy, HAART and tuberculosis risk in HIV-infected adults in South Africa: a prospective cohort Journal of the International AIDS Society 23(5):631–636
4. https://www.who.int/news-room/fact-sheets/detail/tuberculosis.
5. World Health Organization. Global Tuberculosis Report. 2016.documents/s23098en/s23098en.pdf
6. Dolin PJ, Raviglione MC, Kochi A. Global tuberculosis incidence and mortality during 1990–2000. Bull World Health Organ 1994;72:213–20.
7. Chretien J. Tuberculosis and HIV. The cursed duet. Bull Int Union TB Lung Disease 1990;65:25–8.
8. Sharma, S K; Mohan, A. Co-infection of Human Immunodeficiency Virus (HIV) and Tuberculosis: Indian Perspective.
9. Crampin AC, Mwaungulu JN, Mwaungulu FD, Mwafulirwa DT, Munthali K, Floyd S, Fine PE, Glynn JR. 2010. Recurrent TB: Relapse or reinfection? The effect of HIV in a general population cohort in Malawi. AIDS 24: 417–426
10. Szakacs, TA, Wilson, D, Cameron, DW, Clark, M, Kocheleff, P, Muller, FJ and McCarthy, A. 2006. Adherence with isoniazid for prevention of tuberculosis among HIV-infected adults in South Africa.
11. Balcells, ME, Thomas, SL, Godfrey-Faussett, P and Grant, AD. 2006. IPT and Risk for Resistant Tuberculosis. Emerging Infectious Diseases12 (5):744-751.
12. Mehandru S, Poles MA, Tenner-Racz K, Horowitz A, Hurley A, Hogan C, Boden D, Racz P, Markowtiz M. 2004. Primary HIV-1 infection is associated with preferential depletion of CD4þ T lymphocytes from effector sites in the gastrointestinal tract. J Exp Med 200: 761–770.
13. Moir S, Chun TW, Fauci AS. 2011. Pathogenic mechanisms of HIV disease. Annu Rev Pathol 6: 223–248.
14. Sousa AE, Carneiro J,Meier-Schellersheim M, Grossman Z, Victorino RM. 2002. CD4 T cell depletion is linked directly to immune activation in the pathogenesis of HIV-1 and HIV-2 but only indirectly to the viral load. J Immunol 169: 3400–3406.
15. Deeks SG, Kitchen CM, Liu L, Guo H, Gascon R, Narvaez AB, Hunt P, Martin JN, Kahn JO, Levy J, et al. 2004. Immune activation set point during early HIV infection predicts subsequent CD4þ T-cell changes independent of viral load. Blood 104: 942–947.
16. Cohen, T, Lipsitch, M, Walensky, RP and Murray, M. 2006. Beneficial and perverse effects of isoniazid preventive therapy for latent tuberculosis infection in HIV–tuberculosis coinfected populations. PNAS 103 (18): 7042- 7049.
17. Golub, JE, Saraceni, V, Cavalcante, SC, Pacheco, AG, Moulton, LH, King, BS, Efron, A, Moore, RD, Chaisson, RE and Durovni, B. 2007. The impact of antiretroviral therapy and Isoniazid preventive therapy on tuberculosis incidence in HIV-infected patients in Rio de Janeiro, Brazil. Journal of the International AIDS Society 21 (11):1441-1448.
18. Akolo, C, Adetifa, I, Shepperd, S and Volmink, J. 2010. Treatment of latent tuberculosis infection in HIV infected persons. John Wiley & Sons, Ltd: Issue 1.
19. World Health Organization. 2010a. Priority research questions for Tuberculosis and human immune deficiency (TB/HIV) in HIV prevalent and resource limited settings. World Health Organization, Geneva. WHO press.