

Original research paper

Uric acid levels in patients on antitubercular therapy at Dr. B.R. Ambedkar Medical College, Bengaluru

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Abstract

Background: Tuberculosis is an infectious disease caused by mycobacterium tuberculosis. The disease burden is huge in developing country like India. Antitubercular therapy is the mainstay of treatment. The drugs in the therapy can cause various adverse effects. Hyperuricemia is one of the adverse effects caused.

Aim: To estimate the levels of serum uric acid level in patients taking antitubercular therapy including pyrazinamide.

Materials and Methods: A prospective study done at DR. BR AMC and H including the 60 patients on antitubercular therapy. Serum uric acid levels are estimated at 0 and 8 weeks of therapy.

Results: Hyperuricemia was significant in patients receiving antitubercular therapy with pyrazinamide. Serum urate level 6.7 +/- 0.6 mg/dl compared to baseline 4.3 +/- 0.8 mg/dl. Hyperuricemia was seen in 46.6%.

Conclusion: Patients on antitubercular therapy including pyrazinamide developed significant hyperuricemia.

Keywords: Hyperuricemia, pyrazinamide, antitubercular therapy

Introduction

There has been a dramatic increase in the cure rate of TB, since the introduction of RIPE Regimen in 1974. But this victory has not been devoid of problems, The 4 drugs INH, Rifampicin, Ethambutol, pyrazinamide not only have to be taken for long duration but are also associated with myriad of adverse drug reactions. One particular innocuous side effects of both pyrazinamide and ethambutol is hyperuricemia. For the last 70 years there has been a debate whether this finding merited therapeutic intervention or could be ignored if the patient was asymptomatic. Even though the hyperuricemia which progressed to gout urate nephropathy requiring pharmacological intervention is low. In a country like India with tuberculosis prevalence 204 case per 1, 00,000 population¹ and global prevalence 133 per 1, 00,000 population in 2020. Even 1% chance of symptomatic hyperuricemia will translate to an increase in morbidity and lead to treatment noncompliance^[3,4].

In this study we sought to estimate the serum urate levels and find the incidence.

Aim

To estimate serum uric acid levels in patients on antitubercular therapy including pyrazinamide

Materials and Methods

The study was conducted at DR BRAMC Bengaluru.

The study included both male and female patients. After applying inclusion, exclusion criteria and obtaining informed consent, eligible patients were recruited for the study.

Inclusion criteria

- Individuals with age above 18 years either pulmonary or extra pulmonary tuberculosis Confirmed by sputum examination Gen X-pert, X-ray, culture.

Exclusion criteria

1. Those who are suffering from co morbidities like Gout, Chronic alcoholism, diabetes, chronic kidney disease, heart failure.
2. Those on drugs known to cause hyperuricemia (thiazides, cyclosporin, chemotherapy).

Total 60 patients recruited for the study after applying inclusion and exclusion criteria. Serum uric acid levels checked at the start of therapy and at 8 weeks of therapy with INH, Rifampicin, pyrazinamide and ethambutol. All the data was statistically analysed using SPSS program.

Results

Out of 60 patients included in the study 48 patients (80%) were diagnosed with pulmonary TB, another 12 (20%) were diagnosed with extra pulmonary TB.

55 of 60 patients received category 1 and 5 patients received category 2. Both category 1 and 2 received pyrazinamide and ethambutol.

Mean serum uric acid level at the start of ATT was 4.31+/- 0.6mg/dl and at 8 weeks of therapy was 6.7+/- 0.8mg/dl. P value 0.01 which is significant.

28 of 60 patients had increased S.uric acid levels which is 46.6% among hyperuricemic patients 8 had symptoms (Arthralgia) which is 28.5% and the rest were asymptomatic.

Table 1: Type of TB

Type	Number	Percentage
Pulmonary	48	80
Extra pulmonary	12	20
Total	60	100

Table 2: Treatment (Categories)

Categories	Number	Percentage
Cat. 1	55	91.7
Cat. 2	05	08.3
Total	60	100

Discussion

Hyperuricemia is normally defined as serum uric acid levels greater than 7.0mg/dl. The approximate level at which urate is supersaturated in plasma. uric acid is produced by purine metabolism. In humans approximately 70% of uric acid is excreted in kidneys remaining passes into GIT ^[5, 6].

Hyperuricemia may be caused by increased urate production or decreased urate excretion.

Pyrazinamide and ethambutol are two antitubercular drugs that can cause hyperuricemia pyrazinamide is a strong urate retention agent causing greater than 80% reduction in renal clearance of uric acid at 300mg therapeutic dose ^[7].

Hyperuricemia has been seen in 43 to 100% patients treated with pyrazinamide (alone or in combination). Ethambutol can alone cause hyperuricemia by decreasing renal clearance but it does so less consistently ^[8].

In our study we found the serum urate levels at 0 and 8 weeks as 4.31+/-0.6mg/dl and 6.7+/-0.8mg/dl respectively which is in consistent with the study done by Jamaluddin *et al.* in patients which is 4.6+/-0.72 and at 8 weeks 6.54+/-0.98mg/dl.

Mahantesh *et al.* from Bangalore found the serum urate level at 5.1 and at 6 weeks 6.6mg/dl. The incidence of hyperuricemia was 41.02% in pyrazinamide treated patients. The incidence of hyperuricemia in 46.6% in our study. Pyrazinamide induced hyperuricemia can range from asymptomatic to symptomatic ^[9, 10].

In our study 28.5% of hyperuricemia patients required treatment for arthralgia.

Conclusion

From our study we concluded that there is a high risk of developing hyperuricemia in patients receiving pyrazinamide and ethambutol in ATT. Though it is mostly asymptomatic few present with mild symptoms which need symptomatic therapy. But the uric acid levels need to be closely monitored in those patients with comorbidities at risk for hyperuricemia.

Conflict of interest

The study has no conflict of interest to declare.

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