ABTRACT

Metformin (MET) has possibilities of utilizing as a combination drug with existing antibiotics for TB therapy and controlling the growth of drug-resistant Mycobacterium tuberculosis (*M. tuberculosis*) strains via production of mitochondrial reactive oxygen species and facilitates phagosome-lysosome fusion. MET whom given to type 2 DM newly TB co-infection patients were improved the SOD level and inhibited of NF-κβ activation. The clinical effect, especially smear reversion, during metformin applied with anti-tuberculosis and insulin in patients with type 2 DM newly TB co-infection were remain unknown, and this result contributes much to our understanding the use of MET in type 2 DM-TB co-infection management.

An observational clinical study was done in DM newly TB co-infection outpatients at Surabaya Paru Hospital, evaluated MET accompanying therapy with golden standard therapy of DM-TB co-infection, insulin and TB treatment regimens. MET therapy were given for at least 2 months, and we compared to comparison group, whom were given insulin and TB treatment regimens. The AFB smear was measured for two purposed 1) for diagnostic, three times measurements before therapy, and 2) for evaluation, two times measurement.

From 42 participants in this study, 22 participants of observation group that received additional MET therapy, 100% had AFB smear reversion conversion after anti tuberculosis intensive therapy. Whereas 25% of 20 participants of comparison group did not undergo reversion inserts AFB smear and needed one-month intermittent therapy. AFB smear reversion difference test using Fisher's exact test showed results of different test $p = 0.046$ ($p < 0.005$), which means that there is a significantly difference of smear conversion between the observation group and the comparison group. Moreover for mechanism purposes, Microtubule-associated Protein1 Light Chain 3B (MAP1LC3B), Superoxide Dismutase (SOD), Interferon (IFN) -γ and Interleukin (IL) -10 levels were measured and also increased after MET therapy during intensive phase of anti TB and insulin therapy.

Conclusion : MET use DM-TB co-infection increases smear reversion. Metformin has the potential of being an additive combination therapy to enhance the effect of anti TB bactericidal on DM infected patients. Metformin enhances the effects of anti TB and insulin therapy in increasing the smear reversion by increasing levels of Microtubule-associated Protein1 Light Chain 3B (MAP1LC3B), Superoxide Dismutase (SOD), Interferon (IFN) -γ and Interleukin (IL) -10 levels. In addition, metformin therapy use during intensive phase of TB treatment regimens and insulin did not result in elevated lactate levels and also MALA, so it concluded that metformin therapy is relatively safe for DM TB coinfection patients

Keyword : type 2 diabetes mellitus-tuberculosis co-infection, metformin, smear reversion, SOD, IFN-γ, IL-10, MAP1LC3B and lactic acidosis