Comparison of Kanamycin and Capreomycin-Induced Hypokalemia in Multidrug-Resistant Tuberculosis Treatment at Dr. Soetomo General Hospital

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Background
Hypokalemia is one of the most prevalent adverse effects found in Multidrug-Resistant Tuberculosis (MDR-TB) patients and it is a serious condition requiring routine monitoring. This study was performed to identify and compare the hypokalemia adverse event during treatment with kanamycin and capreomycin among MDR TB patients as well as to analyze factors contributed to hypokalemia.

Methods
A retrospective cross-sectional study using MDR-TB patient's medical records from January 2018 to June 2020 at MDR-TB Unit Dr. Soetomo Hospital Surabaya in Indonesia.

Results
112 MDR TB patients met the inclusion criteria where 68 patients used kanamycin and 44 patients used capreomycin.

Demographic patients

Gender

- Woman 43.6%
- Man 56.4%

Comorbid

- No comorbid 52.7%
- Diabetes mellitus 37.5%
- hepatitis B 0.9%
- Diabetes + hypertension 5.4%

Age

- <20 8%
- 20-40 33.9%
- 41-60 50%
- >60 8%

Regimen therapy

- Short term regimen 72.5%
- STR switch to individual regimen 17.9%

Reasons of switching regimen

- No conversion after 3 months 5%
- Not known 10%
- Resistant to the drugs 35%
- Adverse drug reactions 50%

Hypokalemia was found in 26 patients (38.24%) in the kanamycin group and 31 patients (70.45%) in the capreomycin group. The mean onset of adverse drug reaction in the kanamycin group was 64.58 days and 60.01 days in the capreomycin group.

Serum potassium levels were significantly lower in the capreomycin group than in the kanamycin group (2.6 mEq/L vs 3.1 mEq/L, p<0.05). The grade of hypokalemia and the need for hospitalization were higher in the capreomycin group.

Analysis of the risk factors such as gender, age, body weight, presence of comorbid, dose per kg received by the patient, and the patient's initial potassium level showed that none of them had a significant effect on the emergence of hypokalemia.

After the Mann-Whitney statistical test was carried out in the two groups, the p value was 0.016, which means that there was a significant difference in the potassium levels of patients experiencing adverse drug reaction in the kanamycin group compared to the capreomycin group, whereas it is lower in the capreomycin group.

Conclusion
There was a significant difference in the potassium levels of patients with hypokalemia adverse reaction in the kanamycin group compared with the capreomycin group. In the capreomycin group, the initial potassium and potassium levels at the time of hypokalemia were significantly lower than in the kanamycin group. Our study emphasizes the importance of routine monitoring of serum potassium during MDR-TB treatment, and need more caution when treatment used the capreomycin-based regimen.