THE EFFECTIVENESS OF TRIPLE-DOSE ALBENDAZOLE IN COMPARISON WITH MEBENDAZOLE FOR THE TREATMENT OF TRICHURIASIS IN CHILDREN

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ABSTRACT

Objective: Trichuriasis is difficult to treat with single-dose anthelmintic. Although a higher cure rate (CR) can be achieved by treatment with triple-dose albendazole and mebendazole, the results of studies are inconsistent. This study aimed to evaluate the effectiveness of triple-dose albendazole and mebendazole in treating trichuriasis.

Methods: A randomized controlled trial was conducted in a primary school in the Pandeglang District, Banten Province, Indonesia in July–August, 2018; 382 children were recruited. Stools were collected and examined microscopically using the Kato–Katz method to identify Trichuriasis eggs. Children positive for Trichuris trichiura were randomized and divided into two groups. One was given a triple dose of 400 mg albendazole and the other a triple dose of 500 mg mebendazole. On day 14 after treatment, stools were reexamined to calculate CR and the egg reduction rate (ERR). Data were analyzed using SPSS version 20.

Results: The prevalence of soil-transmitted helminth infection was 42%, and that of trichuriasis and ascariasis was 25.1% and 29.8%. There was a significant difference (Wilcoxon test, P<0.01) in the intensity of infection before and after intervention. Both groups showed high values of CR (mebendazole: 95.2%, albendazole: 85.4%; Fisher’s exact test, P = 0.125) and ERR (mebendazole: 99%, albendazole: 96%; Mann–Whitney test, P = 0.110). There was no significant difference in CR and ERR between the two groups.

Conclusion: Triple-dose albendazole was as effective as triple-dose mebendazole in treating trichuriasis.

Keywords: Trichuriasis, Albendazole, Mebendazole, Cure rate, Egg reduction rate

INTRODUCTION

Trichuriasis is a helminth infection caused by the soil-transmitted helminth (STH). Trichuris trichiura. This disease is a community health problem, especially in areas where poverty is prevalent, along with a low socioeconomic status and unhealthy hygiene habits [1, 2]. In the Sumba Barat Daya District, Indonesia, the prevalence of trichuriasis is as high as 64%, and the disease is of great concern throughout Indonesia [3, 4].

T. trichiura lives in the colon, specifically in the caecum where it threads itself into the colonic mucosa and ingests superficial tissue leading to tissue injury and bleeding. The worm inserts its cephalic threads itself into the colonic mucosa and ingests superficial tissue

increased by giving triple doses (three days in a row) of albendazole and mebendazole [6]. Some studies have reported that the effectiveness of triple-dose mebendazole was better than triple-dose albendazole, although the results were not consistent between the studies [7, 8]. Therefore, it is necessary to investigate further the effectiveness of a triple dose of 400 mg albendazole and 500 mg mebendazole against trichuriasis.

MATERIALS AND METHODS

This study was approved by the Ethical Committee on Health Research, Faculty of Medicine, Universitas Indonesia (protocol No. 626/UN2. F1/ETIK/V/2018). We conducted a randomized controlled trial (RCT) that was preceded by a cross-sectional study to determine the prevalence of trichuriasis. The study was conducted at a primary school in Panimbang Village, Pandeglang District, Banten Province (total sampling), and data were collected in July–August 2018. The subjects’ characteristics, the prevalence of trichuriasis, intensity of infection, CR, and egg reduction rate (ERR) were recorded.

Subjects were children aged 6–12 y who tested positive for T. trichiura eggs based on fecal examination. Parents consented to their children’s participation in this study. Children with fever were excluded. To determine the necessary number of study subjects, screening of trichuriasis prevalence was performed, and the number was calculated based on the formula:

\[ n = \frac{Z_{\alpha}^2 \times P \times Q}{d^2} \]

\[ n = \frac{1.96^2 \times 0.54 \times 0.46}{0.05^2} = 382 \]

P: Prevalence of trichuriasis: 54% (determined from a cross-sectional study in Perokonda Village, Sumba Barat Daya District)

Q: 1-P
RESULTS

Table 1 shows the subjects’ characteristics based on gender and age. Girls are shown to have a higher proportion of trichuriasis, ascariasis, and mixed infection (trichuriasis + ascariasis). However, regarding the proportion of infection, there is no significant gender difference. Furthermore, subjects were divided into two age categories; 7–9 y old and 10–12 y old. Older children had a higher proportion of trichuriasis and mixed infection, but the proportion of ascariasis infection was the same.

Table 2: Proportion and mean EPG of trichuriasis before and after intervention

| Characteristics | Mixed Infection | T. trichiura | A. lumbricoides |
|-----------------|-----------------|--------------|---------------|
| Gender          |                 |              |               |
| Male (n = 183)  | 70 (38.3%)      | 46 (25.1%)   | 45 (24.6%)    |
| Female (n = 199)| 89 (44.7%)      | 51 (25.6%)   | 69 (34.7%)    |
| Chi squared test, P | 0.200        | 0.912        | 0.031         |
| Age (years)     |                 |              |               |
| 7–9 (n = 162)   | 68 (42.0%)      | 36 (22.2%)   | 57 (35.2%)    |
| 10–12 (n = 220)| 91 (41.4%)      | 61 (27.7%)   | 57 (25.9%)    |
| Chi squared test, P | 0.005        | 0.227        | 0.051         |
| Total (n = 382) | 159 (41.6%)     | 97 (25.4%)   | 114 (29.8%)   |

Based on sample size calculation, the trichuriasis subjects were divided equally into two groups, each group consisting of 37 subjects. The minimum sample size for both groups was thus 74 subjects. However, because the number of children who fulfilled the study criteria was 97, all subjects were included in this study and divided into an albendazole-treated group (n = 49) and a mebendazole-treated group (n = 49). All subjects in the albendazole group had a light infection, while in the mebendazole group, two subjects had a moderate infection, and the others mostly had mild infections. Criteria intensity of infection above are following WHO [6].

After intervention, seven subjects (14.6%) in the albendazole-treated group and two subjects (4.1%) in the mebendazole-treated group still tested positive for T. trichiura eggs. Both groups showed a significant reduction in the proportion with infection and mean EPG, although the reduction was greater in the mebendazole-treated group. There was a significant reduction in mean EPG in both groups (Table 2).

Table 3 presents the CR and ERR of T. trichiura after albendazole and mebendazole treatment. Both drugs have a high CR; mebendazole has a higher CR compared with albendazole, but there is no significant difference in CR between the two drugs. The ERR values of both drugs are similar, with no significant difference between them. During treatment, there were three adverse reactions: one allergic reaction in the form of urticaria in one subject in the albendazole group, generalized edema in two subjects in the mebendazole group, and the passage of worms from the mouth in four subjects in the mebendazole group.
trichuriasis infection can affect children’s growth and school performance [14]. Another study in Honduras revealed that trichuriasis can lead to anemia, malnutrition, and ultimately growth retardation [15]. Therefore, treating the parasitic infection in children must be prioritized and given special attention, as it affects the future generation of a country.

CONCLUSION

Triple-dose albendazole and mebendazole are both equally effective in treating school-aged children with trichuriasis. Both groups showed a high CR (mebendazole, 95.2%; albendazole, 85.4%) and a high ERR (mebendazole, 99%; albendazole, 96%).

DATA AVAILABILITY

The data used to support the findings of this study are included in the article.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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