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Field test of the “dose pole” for praziquantel in Zanzibar

A. Montresor^{*}, D. Engels^{*}, M. Ramsan[§], A. Foun[°], and L. Savioli^{*}

^{*}Communicable Diseases (CDS), World Health Organization, Geneva, Switzerland [§]Pemba Public Health Laboratory, Ivo de Carneri. Chake Chake, Pemba, United Republic of Tanzania [°]Ministry of Health Zanzibar, Zanzibar, United Republic of Tanzania

Abstract

A pole, estimating the number of tablets praziquantel needed for treatment was field tested on 1,289 children in Zanzibar. A bathroom-type scale performed better than the dose pole in delivering the optimal dose (40–60 mg/Kg) and the two methods performed similarly in delivering a dose considered acceptable (30–60 mg/Kg).

Keywords

Schistosomiasis; praziquantel; dosage determination

Introduction

WHO advocate the control of schistosomiasis by regular treatment of vulnerable groups with praziquantel, delivered through school and health services.

One of the major disadvantages for a wide delivery of praziquantel is the fact that its dosage has to be calculated according to weight. Hall *et al* (1999), recognizing that the provision of sufficient number of weighting scales to maintain long term, mass dosing programmes in the rural areas of developing countries was a major problem, proposed the use of a pole to estimate the number of tablets of praziquantel to be used for each individual. A dose pole was tested on height and weight data of more than 25,000 children from 10 countries with positive results (Montresor *et al*. 2001).

Aim of the present study is to field test in Zanzibar the dose pole and compare its performance with the performance of a bathroom type scale. A digital scale was used as a golden standard.

Material and Methods

A wooden pole was locally produced, with the thresholds and the corresponding dosages described by Montresor *et al*. (2001): 110–125 cm = 1,5 tablets, 125–138 cm 2 tablets,

138-150 cm = 2,5 tablets, 150-160 cm = 3 tablets 160-178 cm = 4 tablets. The local cost of producing the wooden dose pole and of purchasing a new scale was similar approximately 6 USD. The field test was conducted in April 2001 on 1,289 children present in Kinyasini School, Zanzibar, United Republic of Tanzania.

Each child received three independent evaluations of the number of tablets of praziquantel needed for his treatment: the first one (golden standard) using a digital scale (Seca Inc., Columbia, MD), the second one using a new bathroom-type scale (Camry Inc., China), the third one using the dose pole.

The results were recorded separately in a way that the personnel involved in estimating the number of tablets with one method was not aware of the results of the other methods.

The dosage of 40-60 mg/kg was considered optimal (WHO 1995). Dosages of 30-40 mg/kg were considered acceptable since reports of use of praziquantel at this dose is reported with good cure rates (Taylor *et al* 1988). At the end of the exercise, all the children present were treated according the dosage calculated on the digital scale weight. Data on praziquantel side effects were collected immediately after the drug distribution and on the two following days.

Chi square test was applied to compare proportions of optimal and acceptable dosage achieved with the two methods.

Results

Weights measured with bathroom-type scale on 5 children were not registered or were unreadable at data entry, but their age and weight were not significantly different from the rest of the sample.

The Table presents, for each method of estimation of the number of tablets of praziquantel, the minimal and maximal dose that would have been delivered (calculated according to the digital scale weight), the percentage of children receiving less than 30 mg/Kg, the percentage of children receiving between 30-40 mg/Kg, between 40 – 60 mg/Kg and over 60 mg/Kg. The bathroom-type scale performed significantly better than the dose pole in providing the optimal dose (89% vs. 78%), the two methods performed similarly in providing acceptable dosages (99.8% vs. 99.2%).

Abdominal pain was reported by two children (0.15%) on day one and disappeared without treatment. No adverse effect were reported in day two and three.

Discussion

The present study is the first field confirmation of the good performances of the dose pole obtained on computerised data sets (Hall *et al.* 1999; Montresor *et al.* 2001).

The pole has similar performances of a bathroom-type scale in delivering appropriate number of praziquantel tablets and, as advantages, the fact that does not need maintenance or reparation, is user friendly and non-medical personnel can use it easily.

The dose pole could also be produced on a strip of paper and included in the box of tablets further reducing production and distribution costs.

Taking into account the excellent safety record of praziquantel (WHO 1995, Bittencourt *et al.* 1990), we consider minimal the health risk for individuals or communities linked to the use of the “dose pole” (0.5% of dosage under 30 mg/Kg - 0.3% of dosage over 60 mg/Kg)

The “dose pole” could represent a further step on the process of making easier for health and school personnel the implementation of the schistosomiasis control strategy promoted by WHO. Therefore we encourage researchers and managers of control programmes on further testing the tool in different settings.

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Table 1

Performances of the bathroom-type scale and dose pole in establish praziquantel dosages (in mg/Kg) if compared with digital scale (golden standard).

		Bathroom-type scale		Dose pole	
	Information available on:	1282 children		1287 children	
	Minimal dose	30 mg/Kg		24 mg/Kg	
	Maximal dose	64 mg/Kg		71 mg/Kg	
	Average dose	45 mg/Kg		45 mg/Kg	
	% dosage < 30 mg/Kg	0		0.5% (n=6)	
ACCEPTABLE DOSAGE	% dosage > 30 mg/Kg and <40 mg/Kg	10.7% * (n= 137)	99.8% (n=1280)	21.2% (n=273)	99.2% (n=1277)
	% optimal dosage > 40 mg/Kg and <60 mg/Kg	89.1% * (n=1143)		78% (n=1004)	
	% dosage > 60 mg/Kg and <80 mg/Kg	0.2% (n=2)		0.3% (n=4)	

* statistically significantly different (p<0.001) from the performance of the dose pole