The effect of Praziquantel in the reduction of the Prevalence of S. mansoni among the school children in New Halfa Scheme, Eastern Sudan

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Abstract

Background: This study aims to evaluate the effect of Praziquantel chemotherapy interventional technique which reflected in the reduction of the prevalence of *S. mansoni* infection among randomly selected school - children in New Halfa Scheme.

Materials & Methods: Between June 2002 – June 2003 two parasitological surveys were conducted in four schools – children in New Halfa Scheme. (2410) pupils were examined by utilizing Kato technique to determine the infection with *S.mansoni*. All those who ensured to be infected in the first parasitological survey were treated by the subscribed dose of Praziquantel i.e. a single dose 40 mg/Kg – body weight.

Results: At the first Parasitological survey the overall prevalence of the intestinal schistosomiasis among the school children in the study area was 54.6% . The males significantly outnumbered the females 45.6% and 30.4% respectively, ($P < 0.05$). At the second Parasitological survey the obtained findings stress that the overall prevalence was 14.3%. The overall knockdown of the infection among the children was 74.0%. Considering the gender reduction, the infection rate of males declined by 78.5% (16.3 %in male) while those of the females reduced by 65.6% (12.5% in females), respectively.

Conclusion: The present study has confirmed the reduction in prevalence rate of *S.mansoni* among the school – children whom were treated by Praziquantel from 54.6% in 2002 to 14.3% in 2003.

المستخلص

خلفية: تهدف هذه الدراسة الى تقييم تأثير دواء برازيكوانتيل بتقنية تداخلية والتي انعكست في الحد من انتشار عدوى المنشقات المانسونية في اطفال المدارس الذين تم اختيارهم عشوائيا في مشروع حلفا الجديدة الزراعي.

المواد والطرق: ما بين يونيو ٢٠٠٢ – يونيو ٢٠٠٣ أجريت دراستين للطفيل المذكور في أربع مدارس للأطفال في مشروع حلفا الجديدة الزراعي. تم فحص ٢٤١٠ تلميذ من خلال هذه الفترة بواسطة تقنية كاتو لتحديد الإصابة بالمنشقات المانسونية. عولج كل الاطفال المصابين في الدراسة الاولي بجرعة واحدة من هذا دواء برازيكوانتيل (٤٠ ملغ/كغ من وزن الجسم).

النتائج: في الدراسة الاولي كان معدل انتشار ألكلي للمنشقات المعوية بين أطفال المدارس في منطقة الدراسة ٥٤.٦٪ وفاقت اصابة الذكور عدد الإناث ٤٥.٦٪ و ٣٠.٤٪ على التوالي، وفي الدراسة الثانية كان الانتشار الكلي للمرض ١٤.٣٪. وقد انخفض معدل الاصابة في الجنسين ، انخفض معدل إصابة الذكور بنسبة (١٦.٣٪ في الذكور)، بينما تلك التي في الإناث بنسبة (١٢.٥٪) ، على التوالي.

الخلاصة: لقد أكدت هذه الدراسة أن هناك انخفاض في معدل انتشار هذا الطفيل في اطفال المدارس الذين عولجوا من قبل البرازيكوانتيل من ٥٤.٦٪ في عام ٢٠٠٢ إلى ١٤.٣٪ في عام ٢٠٠٣ وهذا يدل علي فعالية هذا الدواء.

Introduction:

About 300 million people in more than 76 countries are infected with schistosomiasis and other 600 million people are at risk of infection[1]. The Sudan is one of the biggest countries in Africa where Bilharziasis constitutes a major health problem. Ideally effective control should involve the combined application of different measures i. e. adoption of integrated control, e.g. schistosomiasis control, morbidity control and transmission control[2.3.4]. Mass chemotherapy of all human cases reduces the infection parameters, morbidity and reduces transmission of the disease[1].

Chemotherapy is playing and will continue to play an important role in the strategy of schistosomiasis control. Population passed chemotherapy has been able to reduce dramatically the prevalence, and severity of the disease in the short time in the area of high endemicity[1]. Treatment strategies of the disease have been transformed by the introduction of Praziquantel. The drug is generally effective against all specie of the parasite in a single dose.

Rapid and dramatic prevalence drop after chemotherapy. To select the appropriate control strategy for an area, one was based on combination

of age prevalence curve[3]. A generalized picture showed that the overall prevalence rises to a peak in school children decade of life before dropping to a some lower level in older age – groups[2, 3]. The selective targeted chemotherapy, treating subjects in defined, high risk groups like the school children with mass treatment[10].

Although safe and efficacious spectrum antiparasitic drugs have been developed, their availability for use in mass-treatment programs and for individual treatment worldwide can be limited by economic resource, existing, manufacturing and distribution network, and national regulations. Praziquantel (PZQ) remains the main strategy for schistosomiasis control[8.9.]

The basic information of the study was to provide an essential background for planning and of the control strategies and tactics[3, 4].

Materials & Method:

Teachers prepared the list of all pupils, 2410 pupils were included in the two parasitological surveys one year spaced, from the selected randomly school-children in the Basic Schools (males and females) for the study. Faecal specimens were collected and examined by two techniques, the modified Kato technique and direct smear technique and examined microscopically for the determination of the epidemiological parameters influencing schistosomiasis transmission in New Halfa irrigation scheme[7]. All candidates who infected in the two parasitological surveys were treated with Praziquantel i.e. a single dose 40 mg/kg – body weight and they improved. The basic information was collected from the school headmasters as well as health committees. An ethical clearance was obtained from the Federal ministry of health and furtherly confirmed by Kassla State Ministry of health.

Results:

The overall prevalence of intestinal schistosomiasis among the school- children in the study area was 54.6% in the first parasitological survey. The overall prevalence in the second survey was declined to 14.3%. The overall reduction rate among the school children in prevalence of S.mansoni infection was 74.0%.Table (1). Considering gender reduction, the infection rates of the males declined by 78.5% while those of the females reduced by 65.6%, respectively. Tables (2 & 3).

Table (1): Overall reduction in prevalence of S. mansoni among the school children in New Halfa Scheme.

Variables / Status	Pre – intervention	Post intervention

Negative	1065	2121
Positive	1355	284
Total	2420	2405

The first prevalence rate = 1355/ 2420 = 54.6%
The Second prevalence = 284/ 2405 = 14.3%
The overall reduction rate =74.0%

Table (2): Overall reduction in prevalence of *S. mansoni* among the male school children in New Halfa Scheme.

Variable / Status	Pre – intervention	Post – intervention
Negative	298	935
Positive	818	174
Total	1116	1109

The first prevalence rate = 818/1116 = 74.7%
The Second prevalence = 174/ 1109 = 16.3%
The overall reduction rate =78.5%

Table (3): Overall reduction in prevalence of *S.mansoni* **among the female**

school children in New Halfa Scheme.

Variable / Status	Pre – intervention	Post –intervention

Negative	730	1132
Positive	574	164
Total	1304	1296

The first prevalence rat = 574/ 1304 = 36.4%

The Second prevalence = 164/ 1296 = 12.5%

The overall reduction rate =65.6%

Discussion:

The present study has confirmed the overall reduction in the prevalence rate among the school children due to intervention treatment with praziquantel, was 74.0%. The reduction level of Bilharziais among the males and females were 78.5%, and 65.6% respectively. It is clear, from the two parasitological surveys in the scheme that mass treatment of the infected school children resulted in the reduction of prevalence of infection among the school children. Large – scale chemotherapy programme usually would result in higher reductions in the levels of morbidity and transmission intensity[3]. In New Halfa scheme, the vast majority of the inhabitants are Muslims, where local culture prevent females to swim or bathe publicly in the canals. Obviously, this reduced the exposure period for them and they generally utilize the store water in the house. The reduction in prevalence rate due to intervention treatment with praziquantel was reported by many researchers[3, 8, 9].

Conclusion:

This study has demonstrated the reduction in the prevalence of the infection of the intestinal schistosomiasis among the school-children due

to the treatment with praziquantel in the study area were statistically significant. These measures should include well constructed national control programme to reduce the infection parameter of *S. mansoni* in New Halfa scheme. Finally a mass treatment campaign is necessitous intervention.

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