

COMPARATIVE STUDY ON THE LOCALIZATION OF ADULT *Schistosoma mansoni* WORMS IN ALBINO MICE ANESTHETIZED WITH PENTOBARBITAL SODIUM, ETHER OR CHLOROPHORM

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SUMMARY

The effect of anesthetic drugs on the localization of adult worms in albino mice was compared. The animals with 56 days of infection were anesthetized with pentobarbital sodium, ether or chlorophorm. Perfusion was carried out immediately after, recovering the worms and classifying them in relation to their localization on the liver or portal vein and the mesenteric veins.

Our results showed that pentobarbital sodium produced a greater displacement of the worms to the liver (89%) than ether (76%) and chlorophorm (34%) did, when compared to the control group (22%).

The difference between pentobarbital sodium and ether was significant ($p < 0.05$). We suggest that anesthetic drugs may not be used in studies on the distribution of adult worms in several hosts.

KEY WORDS: *Schistosoma mansoni*; Schistosomiasis mansoni; localization; Anesthetics; Pentobarbital sodium; Ether; Chlorophorm.

INTRODUCTION

After reaching sexual maturation, most of the *S. mansoni* adult worms migrate, mated, from the hepatic region toward the mesenteric veins¹⁵, and start egg-laying^{1,9}.

The adult male worm contributes to the efficiency of this migration, through its ability to adhere by suckers¹, the longitudinal muscles enhance movements on the body of the helminth¹³ and presents a texture characteristic of the tegument in permissive hosts¹¹.

However, topographical distribution of adult worms may be affected by the action of schistosomicidal drugs^{4,16} or other pharmacologically active substances, like some anesthetics, ether² halothane⁴ and barbiturates, which promote the migration of worms from the mesenteric veins to the liver.

The present paper compares the final site of adult *S. mansoni* worms in albino mice submitted to volatile anesthetic (ether or chlorophorm) or injectable (pentobarbital sodium) drugs.

MATERIALS AND METHODS

Animals used and experimental infection. Female albino mice weighing 22 g were inoculated subcutaneously⁷ with 100 cercariae (BH strain, Brazil).

Experimental groups. After 56 days of infection, the animals were submitted to the following treatments:

Group I - anesthetized with a cotton plug soaked in ether in a transparent chamber.

Group II - anesthetized with a cotton plug soaked in chlorophorm in a transparent chamber.

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Group III — anesthetized with pentobarbital sodium (1.25 mg/wb).

Group IV - non-anesthetized animals which were sacrificed by cervical fracture (control group).

Immediately following anesthesia, the animals were perfused¹⁴, recovering the worms and identifying these as related to the site of recovery: liver, main branch of portal vein and mesenteric veins. The relation between both sexes was measured.

Analysis of data. The Chi-square or Mann-Whitney tests were used, considering values of $p \leq 0.05$ as significant differences¹².

RESULTS

The anesthetics did not interfere on the global rate of worm recovery; 21% on group III, 22% on group II and 26% on groups I and IV. The male/female proportion was 1.0:1.0.

The topographical distribution of adult worms recovered from the animals submitted to several anesthetics is shown in Figure 1. The total amount of worms found in the liver was greater in the animals anesthetized with pentobarbital sodium (89%) than in those with ether (76%) and chlorophorm (34%). In the control group, the recovery rate was only 22%.

Localization

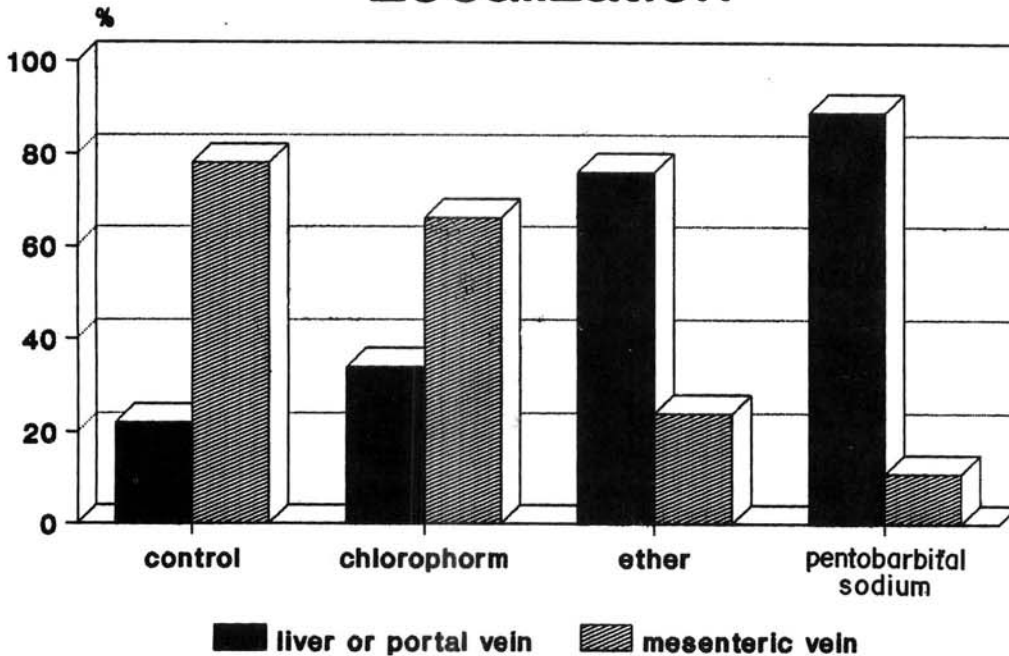


Figure 1. Localization of *Schistosoma mansoni* adult worms (liver or portal vein and mesenteric vein) in white mice, after anesthesia with pentobarbital sodium, ether or chlorophorm.

The Mann-Whitney test confirmed the differences obtained for pentobarbital sodium and ether as significant to the level of $p < 0.05$.

DISCUSSION

In experimental schistosomiasis mansoni of permissive hosts, topographical distribution of

adult worms depends on the male/female rate, with a larger number of helminths in the liver when this proportion becomes further than one⁶. When there is a numerical equivalence between the sexes, migration to the mesentery is more efficient¹⁵.

Our results support this statement, since in the group of non-anesthetized animals, 78% of the worms were recovered from the mesenteric veins.

The degree of anesthetic effects depends on the host and the used dose. This experiment confirms that pentobarbital sodium³ and ether^{2,4} have a greater ability to shift the schistosomes to the portal system, possibly due to the relaxing effect of these drugs on the muscles^{5,8,10}.

On the other hand, assays carried out with *Nectomys squamipes* (Rodentia: Cricetidae) did not find greater density of worms in the liver of animals after anesthesia with ether or pentobarbital sódico (unpublished data).

Comparing the effect of inhaling anesthetics (ether and chlorophorm), it is shown that the first had a greater action power. Perhaps this difference may be explained through the way of action of each drug; while ether leads to a peripheric swelling of the blood vessels and easing of the muscles, chlorophorm acts on the swelling of splenic vessels⁵, which would not have any direct action on the adult worms.

Experiments aiming to measure the effect of these anesthetics and swelling or constricting drugs on the adult worms are now being conducted.

Considering our results, we suggest that the technique of cervical displacement or other ones not involving anesthesia should be used in order to determinate the localization of *Schistosoma mansoni* adult worms.

RESUMO

Estudo comparativo sobre a localização de vermes adultos de *Schistosoma mansoni* em camundongos albinos anestesiados com pentobarbital sódico, éter ou clorofórmio.

Comparou-se o efeito de drogas anestésicas na localização de vermes adultos em camundongos albinos. Com 56 dias de infecção os animais foram anestesiados com pentobarbital sódico, éter ou clorofórmio. Imediatamente realizou-se a perfusão, sendo os vermes recolhidos e classificados quanto à localização em fígado ou veia porta e nos vasos mesentéricos. Nossos resultados demonstraram que o pentobarbital sódico produziu maior deslocamento dos vermes para o fígado (89%) do que o éter (76%) e o clorofórmio (34%) quando comparados com o grupo controle (22%). As diferenças para o pentobarbital sódico e o éter fo-

ram significativas ($P < 0,05$). Sugerimos que os anestésicos não sejam utilizados nos estudos sobre a distribuição de vermes adultos nos hospedeiros.

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