

THE EFFECTS OF EMETINE ON THE HEART

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The toxic action of emetine on the myocardium in experimental animals is well recognized, but there are conflicting reports on the frequency with which a toxic action occurs in man during the treatment of amœbic dysentery. Manson-Bahr (1939) states that emetine may produce cardiac irregularity and a fall of blood pressure. On the other hand, Brown (1935) at the Mayo Clinic states that myocardial damage is rare, and Heilig and Visveswar (1943) who studied the electrocardiographic changes following the intravenous injection of emetine in 31 cases found no signs of cardiac irregularity, extrasystoles, or heart block. They describe frequent lowering of the T waves in one or more leads, with occasional inversion of T III and T IV.

In the present investigation, changes in the electrocardiogram, blood pressure, and heart rate were studied in patients under treatment for amœbiasis. The patients were otherwise healthy soldiers between the ages of 20 and 40, and in none was there any evidence of wasting or marked toxæmia. In most cases, the standard Middle East Forces treatment for amœbiasis was followed—emetine, 1 grain, intramuscularly, with 2·5 per cent quinoxyl retention enemata, daily for 10–12 days, followed by carbasone, 0·25 g., twice daily for 8 days, and then emetine bismuth iodide, 3 grains each night, for 10 nights. The patients were confined to bed while receiving emetine and emetine bismuth iodide, and serial blood pressure readings were taken during the course. Cardiograms were taken before and immediately after the emetine injection in 32 cases, and before and after emetine bismuth iodide in 8 cases (4 of these had previously received a course of emetine injections and the cardiograms had returned to normal before the emetine bismuth iodide was commenced). It was considered that the influence of quinoxyl could be ignored, as similar changes in the cardiogram occurred when emetine was given alone or combined with the quinoxyl enemata. Owing to shortage of paper, the rate of return to normal of the cardiogram was studied in 8 cases only.

FINDINGS AFTER EMETINE

The cardiographic changes in 32 cases following the injection of emetine (total course 8–12 grains) are summarized below.

P wave	No change	21 cases
	Increased amplitude	3 "
	Decreased "	8 "
P-R interval	No change	20 "
	Increased amplitude	12 "
	Decreased "	7 "
QRS complex	No change	24 "
	Increased "	1 case
	Decreased "	6 cases
T wave	Diminished in one or more leads	25 "
	Increased "	1 case
	Increased " " "	1 case

Blood pressure. Serial estimations of blood pressure were made in 21 cases. In 13 there was no significant change. Six showed a transient fall of from 15 to 20 mm. in the middle of the course, but had regained their initial blood pressure at the end. In only two cases was there a persistent fall in blood pressure during treatment.

Pulse rate. This showed no significant change in any of the patients under observation.

FINDINGS AFTER EMETINE BISMUTH IODIDE

The cardiographic changes in 8 cases following administration of emetine bismuth iodide by mouth (total course 30-36 grains) are summarized below.

P wave	No change	7 cases
	Increased amplitude	1 case
	Decreased „	—
P-R interval	No change	1 „
	Increased amplitude	7 cases
	Decreased amplitude	3 „
QRS complex	No change	5 „
	Increased „	—
	Decreased amplitude	7 „
T wave	No change	—
	Increased „	1 case
	Decreased amplitude	7 „
	Increased „	1 case

There was no significant change in either blood pressure or pulse rate in any case during treatment with emetine bismuth iodide.

DISCUSSION

The cardiographic changes produced by emetine and emetine bismuth iodide are similar. Owing to incomplete disintegration of some brands of the latter supplied, it has been our custom to divide the tablets to ensure that they are dissolved in the alimentary tract, and the occurrence of nausea or vomiting 4-6 hours after administration, suggests that absorption of the emetine has taken place.

The most striking effect on the cardiogram has been the diminution or inversion of the T waves during treatment. This may occur in one or more leads, and is illustrated in Fig. 1 and 2. An increase in the P-R interval of from 0.02 to 0.04 sec. was observed in 19 cases in all, but in no case did the P-R interval extend beyond the upper limit of normal. Changes in the P waves were small and infrequent.

The rate of return to normal of the cardiogram was followed in 8 cases. Changes in the T waves and P-R interval had disappeared in 8-12 days after the completion of treatment in all cases and there was no evidence of residual myocardial damage.

In this series of cases, and in over 250 cases of amœbiasis treated in this hospital, the authors have seen no clinical evidence of myocardial insufficiency during emetine treatment. In this connection it must be stressed that the type of amœbic dysentery encountered in New Zealand troops in the Middle East and Central Mediterranean Forces has been mild. None of our cases has shown evidence of malnutrition or toxæmia, and in all cases the initial

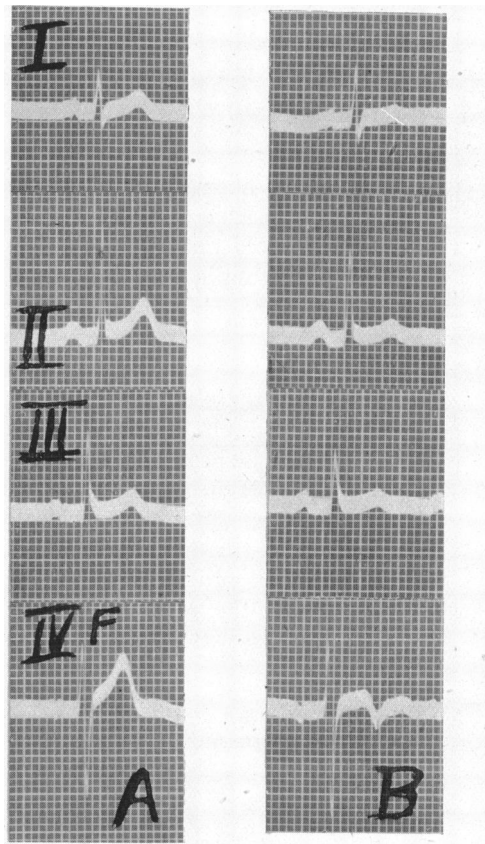


FIG. 1.—Electrocardiograms before and after treatment. Case 16. (A) October 14, 1944, before treatment. (B) October 26, 1944, after emetine, 1 grain for 10 days, showing flattening of T I, T II, and T III with inversion of T IV.

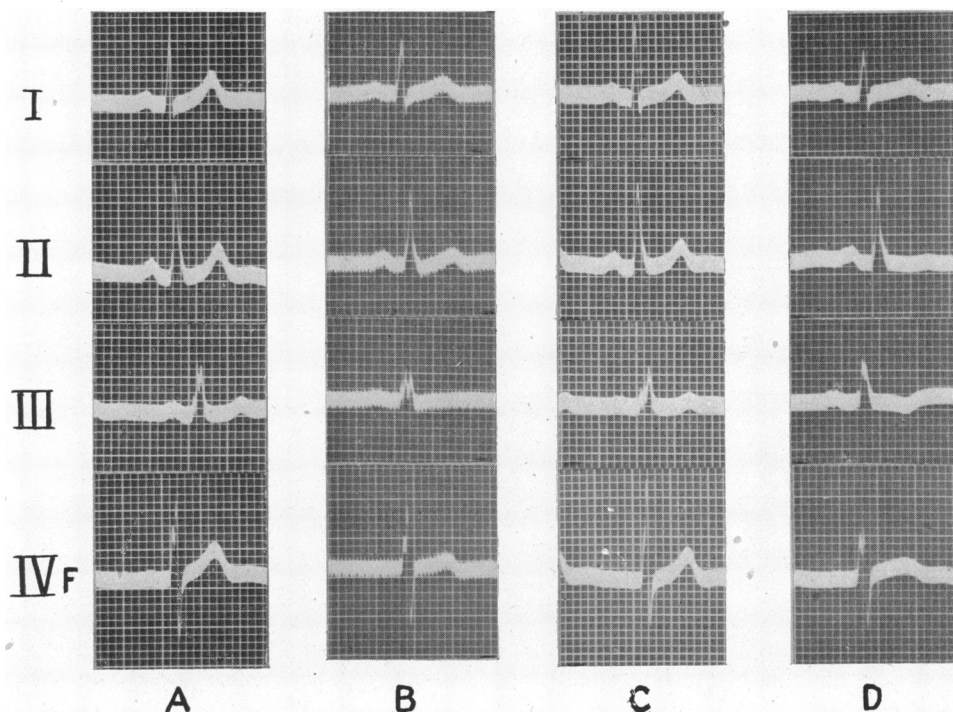


FIG. 2.—Electrocardiograms before and after treatment. Case 16. (A) April 2, 1945, before treatment. (B) April 15, 1945, after emetine, 1 grain for 10 days, showing flattening of T waves in all leads (C) April 24, 1945, showing T waves returning to normal. (D) May 7, 1945, after emetine bismuth iodide, grains 3 for 10 days, showing flattening of T I, T II, and T IV with inversion of T III, and decreased amplitude of QRS in all leads.

cardiogram was normal. Our experience is in agreement with that of Brigadier Bedford, Consulting Physician, Middle East Forces, who, in a personal communication, states that he knows of only one certain case and one doubtful case of toxic action of emetine on the heart occurring in that Command up to the end of 1944.

SUMMARY

Changes in the electrocardiogram, blood pressure, and pulse rate produced by emetine and emetine bismuth iodide have been studied in soldiers under treatment for amœbiasis. All were otherwise healthy and the initial cardiograms were normal. Diminution or inversion of the T waves occurred in one or more leads in 25 out of 32 cases receiving emetine and in 12 cases there was an increase in the P-R interval of from 0.02 to 0.04 sec. Similar changes occurred during treatment with emetine bismuth iodide, 7 out of 8 cases showing diminution in T waves and prolongation of the P-R interval. The cardiogram returned to normal 8-12 days after the completion of treatment. The effect on the blood pressure and pulse rate of both drugs was insignificant, and in no case was there any clinical evidence of myocardial insufficiency.

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