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HEART RATE OF BLACK BEARS
IN RELATION TO AGE

Raymond J. Hock

January 1966

ARCTIC AEROMEDICAL LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
FORT WAINWRIGHT, ALASKA

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FOREWORD

The research reported in this paper was done at the Arctic Aeromedical Laboratory under Project 8237, Task 823702, from 6 January 1965 to 1 September 1965.

This technical report has been reviewed and is approved.



HORACE F. DRURY
Director of Research

ABSTRACT

Records were made of heart rates of 4 black bears, 2 males and 2 females, ages 1 to 42 months, weighing 0.6 - 70 kg. In the large bears, succinylcholine chloride was administered intramuscularly. The cubs were held while syringe needles connected to an EKG machine were inserted subcutaneously. It appears there is a marked fall in heart rate in black bears with increasing age until adulthood is reached. Succinylcholine vs. handling without anesthetic does not appear to be a factor in the results. Rates seem high, especially those of the larger, older bears. Though rectal temperature was normal, the excitement incident to anesthetic injection and the convulsive nature of its onset of action must be considered as factors in elevation of heart rate. Thus it seems possible that heart rates of the young bears are more reliable and that decrease in heart rate with age is even more marked than shown here.

Observations on the heart rates of bears are understandably rare. In the course of studies on the physiology of lethargy in the black bear (1, 2), several opportunities were taken to record heart rates. The bears used were 4 black bears, 2 males and 2 females, ranging in age from less than 1 month to 42 months, and in weight from 0.6 to 70 kg. In the large bears succinylcholine chloride was administered intramuscularly, the dosage being about 1.5 to 3.0 ml/bear, depending on size. These bears were caged, and the succinylcholine was administered by syringe on the end of a lance. The black bear cubs were freely roaming in the laboratory annex, and were held down briefly while syringe needles connected to the EKG machine were inserted subcutaneously. Struggling negated many of these attempts to obtain heart rates of unanesthetized bears. Due to the rapid and violent response of "hibernating" bears to disturbance, especially touch, no attempts to make records during the lethargic condition were successful.

Colonic temperature was measured at the same time, and varied only between 37.0 and 38.0^o C, except in the case of the young cubs, where some temperature fluctuation was evident. Heart rate varied during the course of most determinations, which were continued as long as feasible. For this reason, mean, maximum, and minimum rates are given in Figure 1. The mean is computed from the rate for all 3-second periods of measurement (X 20), while the maximum and minimum are the highest and lowest 3-second rates (X 20).

Some points appear from Figure 1. First, there is a marked fall in heart rate in the black bears with increasing age, persisting until adulthood is reached. Second, succinylcholine vs. handling without anesthetic does not appear to be a factor in the results, as shown by the continuing drop of the cubs' heart rate. These small bears were all used to rough play.

Svihla and Horita (3) anesthetized an adult male black bear, weighing 211 pounds, with sodium pentobarbital. They found heart rate varied from 160/minute after injection (in a squeeze cage) to values of 110, 120, and 100/minute at apparently differing degrees of sedation. This bear was probably more than 48 months of age, so results are in line with the data recorded on Figure 1. It should be added that there was no apparent effect of succinylcholine anesthesia levels on the heart rate in the present study.

Rates reported here seem high, especially those of the larger, older bears. Although succinylcholine has no effect on the heart, it may be that the high mean rates are due to the fact that the anesthetic was wearing off. In this case, the minimum rates would have higher significance. These, too, appear high. Average heart rate for a man 20 to 24 years old is 74, range 41-100 (4).

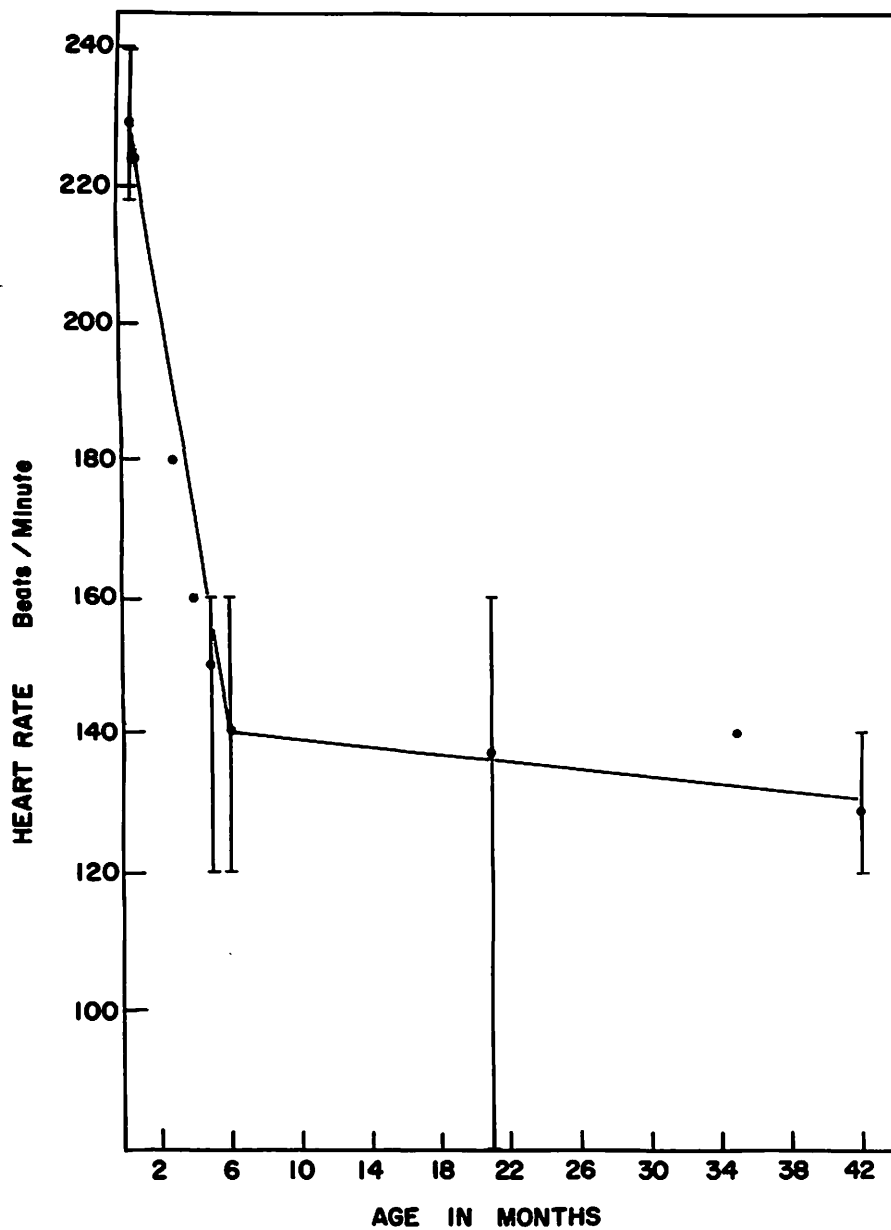


FIGURE 1

Mean, maximum, and minimum heart rates
of black bears in relation to age

The excitement incident to the injection of the anesthetic and the convulsive nature of its onset of action must be considered as factors in elevation of the heart rate. However, rectal temperature is normal (2), but the rapidity with which the heart rate may be elevated is much greater than that with which the rectal temperature can rise in as large an animal as the adult bears.

Thus, it seems possible that the heart rates of the young bears are more reliable, and that the decrease in heart rate with age is even more marked than shown here.

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