

BODY WATER AND HEAT POLYPNEA IN DOGS

By

SURENDRA KUMAR¹ AND A. S. SINHA

From the Department of Physiology, Patna University, P. W. Medical College, Patna

(Received June 30, 1961)

Ederstrom (1954) observed panting type of respiration at a body temperature of 42°C in dogs. Kumar and Sinha (1961) had reported a very sharp increase in respiration rate of dogs on raising their body temperature above 41°C, and further increase on opening their mouth. These observations were absent in six out of sixty dogs investigated even when their body temperature was raised to 42°C. Therefore, reasons for non-appearance of heat polypnea in some of the dogs have been investigated and reported in this paper.

METHODS

Observations were made on ten dogs. They were deprived of water for 24 hrs. Then they were anaesthetised with chloralose 75-80 mg per kg body weight given intravenously. The method adopted for raising the body temperature and recording of respirations was same as described earlier (Kumar and Sinha, 1960).

RESULTS

About an hour after anaesthesia in dogs deprived of water for 24 hrs, the initial respiration rate varied between 12 to 26 per minute at initial body temperature ranging between 37.5°C-39°C. On raising their body temperature upto 42°C the respiration rate showed only slight increase over the initial value. Injections of variable amounts of normal saline intravenously remarkably increased the respiration rate in all cases. In one dog the initial respiration rate was 14 per min and on raising its body temperature to 42°C the respiration rate increased only to 44 per min (Fig. 1). On injection of 300 ml of normal saline intravenously the respiration rate increased to 60 per min (Fig. 2). On further injection of 50 ml of normal saline intravenously the respiration rate suddenly increased to 232 per min (Fig. 3) and at the same time became shallow.

1. Present address: Department of Physiology, K. G. Medical College, Lucknow.

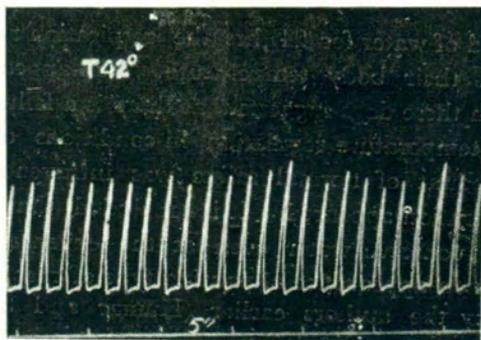


Fig. 1

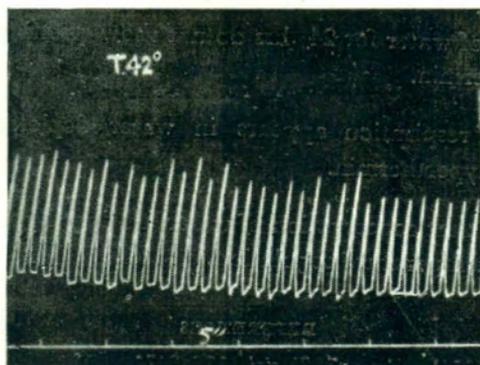


Fig. 2



Fig. 3

Dog. 7. Respirations at 42°C body temperature. In Fig. 1 before injection of any saline. In Figs. 2 and 3 after intravenous injection of 300 ml and another 50 ml of normal saline respectively.

DISCUSSION

In dogs deprived of water for 24 hrs the respiration rate showed slight rise with increase in their body temperature. Non-appearance of panting type of respiration in these dogs suggests that there is a failure of the respiratory mechanism for temperature regulation in conditions of water depletion. When sufficient amount of normal saline was intravenously injected the panting type of respiration appeared. It is concluded that in conditions of water depletion dogs conserve water even at the expense of rise in body temperature. The non-appearance of panting type of respiration in some of the dogs reported by the authors earlier (Kumar and Sinha, 1961) was, therefore due, in all likelihood, to low reserves of body water.

SUMMARY

Dogs deprived of water for 24 hrs do not show panting type of respiration during hyperthermia.

Panting type of respiration appears in water depleted dogs on saline transfusion during hyperthermia.

It is concluded that conservation of water during hyperthermia in dogs takes priority over temperature regulation.

REFERENCES

- Ederstrom, H. E. (1954). *Amer. J. Physiol.*, **176**, 347.
Kumar, S. and Sinha, A. S. (1960). *Ind. J. Physiol. Pharmacol.*, **4**, 179.
Kumar, S. and Sinha, A. S. (1961). *Ind. J. Physiol. Pharmacol.*, **5**, 31.
-