

## Prevention of Anesthetic Deaths in Chickens

Sir:

Since the work of Coon (1), Smith (2), and Thompson (3), the chicken has become an important laboratory animal, especially for the biologic assay of oxytocic activity of posterior pituitary extract. The depressor response to the injection of posterior pituitary extract is the basis for the U.S.P. method of assay (4). Usually the birds are anesthetized with a barbiturate. Jordan *et al.* (5) have investigated the response to pentobarbital intravenously and to combinations of this barbiturate with intramuscular phenobarbital and with a mixture of chloral hydrate and magnesium sulfate in the fowl. These authors concluded that intravenous pentobarbital in small doses induced a short period of anesthesia; higher doses caused a high mortality.

Early in our use of the chicken for assay of posterior pituitary extract, the authors had seven of 26 chickens die suddenly within 5 to 45 minutes following the administration of sodium pentobarbital. The sudden deaths, resembling respiratory failure, were preceded by convulsive seizures. Our regular dose is 20 mg. of sodium pentobarbital per kilogram as a freshly prepared saline solution containing 10 mg. of sodium pentobarbital per milliliter injected slowly into a wing vein. As a rule, this dose anesthetizes birds weighing 1.8 to 2.3 Kg. deeply enough to perform surgery and to keep the blood pressure between 110 and 130 mm. Hg. Further pentobarbital is injected as needed to maintain light anesthesia.

Normally, the experimental procedure is to

tie the animal to a board or table, so that the head rests at or below the level of the heart. This position may lead to pooling and stagnation of blood in the head. Kaupp (6) reported that the veins of birds differ from those of mammals in that they have fewer valves, and the valves are also less perfect and often permit a backward flow of blood. It is possible that stagnant blood in the head may lead to anoxia and, along with the anesthetic, can embarrass the respiratory center.

In our recent work, the bird is kept upright and, as soon as head-drop and respiratory slowing appears during injection of the anesthetic, the head is mounted above the level of the heart. The head is mounted by grasping the chicken's comb with a hemostat or other clamp and attaching the clamp to a rod on a ring stand. The head is kept above the level of the heart for the remainder of the test.

To date, of 134 chickens with the heads supported as described, only two were lost by sudden death. In these two cases, the chickens were obese, and death could have resulted from an overdose of anesthetic since the dose is usually based on lean body mass.

- (1) Coon, J. M., *Arch. Intern. Pharmacodyn.*, **62**, 79(1939).
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- (3) Thompson, R. E., *ibid.*, **80**, 373(1944).
- (4) "United States Pharmacopeia," 16th rev., Mack Printing Co., Easton, Pa., 1960.
- (5) Jordan, F. T. W., Sanford, J., and Wright, A., *J. Comp. Pathol. Therap.*, **70**, 437(1960).
- (6) Kaupp, B. F., "The Anatomy of the Domestic Fowl," W. B. Saunders Co., Philadelphia, Pa., 1918, p. 211.

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