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Effect of Pentobarbital Sodium Anesthesia upon Volume Blood Flow, Arterial Pressure and Heart Rate.* (20005)

C. J. IMIG, BARBARA F. RANDALL, AND H. M. HINES.

From the Department of Physiology, State University of Iowa, Iowa City, Ia.

Pentobarbital sodium is one of the most widely used general anesthetics for animal experimentation. Few studies have been reported concerning the effects of this barbiturate upon peripheral circulation. Richter and Oughterson(1) reported that its administration was followed by a marked vasodilator effect. Tabern(2) found that this drug had little effect on blood pressure and respiration when administered to laboratory animals in doses of 30 to 45 mg per kg of body weight. Morrison, Walker, and Richardson(3) found that gradually increasing doses of pentobarbital produced a gradual fall in blood pressure and a marked increase in pulse rate of dogs. The experiments described in this report are concerned with the effects of anesthetic doses of pentobarbital sodium upon pulse rate, arterial pressure and volume of blood flow through the femoral artery of adult dogs.

Method. The methods employed in these studies permitted the continuous recording of volume blood flow, arterial pressure and heart rate before, during and after the intravenous injection of an anesthetic dose of pentobarbital sodium (35 mg per kg of body weight). Volume blood flow was measured through the femoral artery by means of an electromagnetic flow meter with the aid of heparin as an anticoagulant(4). Pre-anesthetic control measurements were made on trained animals. This procedure required infiltration of the area of cannulation with a 2% solution of procaine hydrochloride. A preliminary period lasting from 15 to 30 minutes was allowed for recording pre-anesthetic values, after which time anesthesia was induced by intravenous injection of 35 mg of pentobarbital sodium per kg of body weight. Injection time required approximately 30 seconds. The anesthetic was made up as a 7% solution of pentobarbital sodium in 15% ethanol.

Results. The results from experiments on 8 dogs are summarized in Table I. Administration of anesthetic doses of pentobarbital sodium was followed by a transient increase in the volume blood flow through the femoral artery, which usually returned to pre-anesthetic values within 15 minutes. In a few cases the increase in blood flow persisted for as long as 30 minutes. Mean arterial pressure declined after anesthetic administration and gradually returned to approximately pre-anesthesia values within 15 to 30 minutes. Increased pulse rate was noted throughout the duration of anesthesia. The administration of an amount of ethanol which would be present in an anesthetic dose of a solution of pentobarbital was found not to cause significant changes in arterial pressure and volume blood flow. In other experiments it was found that the administration of "booster" doses of pentobarbital sodium in amounts of 10 to 20 mg per kg of body weight was followed by transient changes in arterial pressure and femoral artery blood flow similar to those found for full anesthetic doses of the drug.

The results of this investigation indicate

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TABLE I. Effect of Pentobarbital Sodium Anesthesia upon Volume Blood Flow, Mean Arterial Pressure and Pulse Rate.

	Pre-anesthetic control	% change from control, min. after inj. .5	1	2	5	15
Flow in cc/min.	45	+119	+110	+62	+13	0
S.D.		97	88	29	25	—
S.L.*		1%	1%	1%	18%	—
Pressure, mm/Hg	130	—16	—35	—33	—17	—12
S.D.		11	6	17	14	10
S.L.*		1%	1%	1%	2%	3%
Pulse rate/min.	110	+34	+36	+41	+39	+39
S.D.		25	20	26	25	25
S.L.*		1%	1%	1%	1%	1%

* Level of significance.

the necessity of being cognizant of the effect of pentobarbital sodium anesthesia *per se* upon volume blood flow and arterial pressure in any experiments in which measurement of changes in these factors are pertinent to a study. Attention should also be called to the finding that supplemental administration of the drug for the purpose of maintaining satisfactory surgical anesthesia was also followed by transient changes of a significant magnitude in blood flow and arterial pressure. A sufficient period of time should be allowed to elapse following anesthetic administration either for recovery of blood pressure and flow to pre-anesthetic control values or to a new steady state. Our findings indicate that considerable variation exists in the time required for such readjustments to be made in experiments on different animals.

Summary. A study was made with the aid of continuous recording of the effects of an anesthetic dose of pentobarbital sodium and of supplemental doses of this drug required for the maintenance of surgical anesthesia upon arterial pressure, pulse rate and volume blood flow through the femoral artery of dogs. Following the administration of this anesthetic there was an immediate increase in volume blood flow and a fall in mean arterial pressure. Recovery to near pre-anesthetic control values usually occurred within 5 to 15 minutes. However, in some experiments recovery was not apparent for as long as 30 minutes after drug administration. Pulse rate remained increased throughout the duration of anesthesia.

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Adrenals and Anterior Hypophysis in Leukemogenesis of Mice.* (20006)

MARTIN SILBERBERG, RUTH SILBERBERG, AND MARION OPDYKE.

From the Snodgras Laboratory, Hospital Division, City of St. Louis, Mo.

In male castrate mice of strain A, anterior hypophyseal transplants significantly increased the incidence of malignant lymphoma (1). This result was tentatively explained as due to hyperadrenalism caused by the grafted hypophyses: Hyperadrenalism leads to depletion of lymphoid tissue, and protracted atrophy of the latter may be followed by hyperplasia and eventually neoplasia(2-4). On the

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