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Direct Measurement of Arterial Blood Pressure in the Guinea Pig. (22375)

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Search of the literature for blood pressure values in guinea pigs revealed measurements of mean pressure only(1-3) which are unusually low for small warmblooded mammals (4,5) and which give no indication of the magnitude of diastolic and systolic pressures. In view of the increasing use of this species in research and an expressed need for reference values(6) measurements under as normal conditions as possible were made to fill this gap.

Methods. A Statham P-23D pressure transducer and Sanborn amplifier and recorder were used to obtain records of end pressures in the carotid arteries of 8 NIH or Hartley strain guinea pigs which weighed 200-1000 g. The animals were etherized for exposure of the artery and then maintained for an hour under local or general anesthesia as indicated. The cannula was made from a #20 hypodermic needle and polyethylene tubing (i. d. 0.86 mm) and was 14.3 cm long. The pressures recorded during 1-minute periods at 0, 15, 30, 45 and 60 min. were averaged for each animal. Mean arterial blood pressure was calculated as the sum of diastolic + ⅓ pulse pressure.

Results. Table I shows the average and the range of pressures for each animal. Systolic pressures above 100 mm Hg were unusual and occurred briefly and only during activity. The highest recorded was 140 mm Hg in guinea pig #24. The blood pressure was unusually stable during rapid intravenous injection of saline, 6% dextran or 3.5% polyvinylpyrrolidone in dosages of 1% of the body weight. Under general anesthesia the mean pressure tended to be lower than when the animal was conscious and active, and it gradually decreased as time progressed. The blood pressure changed only momentarily in 2 guinea pigs (#8 and #24) when they were placed in the prone position.

Discussion. Since these measurements were made on occluded arteries, the recorded pressures are slightly elevated over the actual values during flow(7). In general, the average rate of descent of late diastolic pressure fell between that of the rat and rabbit in Table II of Woodbury and Hamilton(8). This was also true of the duration of systole and diastole. However, in 14 of the 33 periods in which it was possible to make measurements, the percentage of the cardiac cycle

TABLE I. Carotid Pressures in Guinea Pigs under General or Local Anesthesia. Average and range in mm Hg.

No.	Anesthesia	Systolic	Diastolic	Mean
17	E, P*	71 (28- 88)	39 (16-48)	50 (22-60)
18	Light E	70 (32- 97)	46 (18-90)	55 (23-87)
19	E, Pr	84 (78-120)	56 (33-76)	66 (25-89)
20	Pr	73 (62- 90)	36 (26-58)	49 (40-61)
21	Pr, E	65 (40-108)	37 (22-69)	46 (30-65)
22	Pr	75 (60- 99)	47 (30-72)	56 (43-81)
23	Pr	92 (56-120)	61 (37-77)	72 (44-90)
24	E, Pr	85 (46-120)	54 (30-74)	64 (36-89)
	Avg	76.7	46.8	57.2

* E = Ether; P = Pentobarb.; Pr = Procaine.

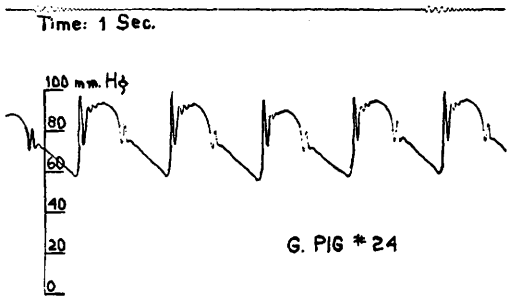

FIG. 1. Record of carotid pressures of a Hartley strain guinea pig weighing about 1000 g under procaine anesthesia, conscious and turned to the prone position 2 min. previously. Mean blood pressure = 68 mm Hg, systolic 88-94, diastolic 55-58, pulse rate 260/min., respiration 64/min., cardiac cycle = 0.232 sec., diastole = 0.118 sec., systole = 49% of cycle, late diastole rate of descent = 179 mm/sec.

taken up by systole (defined as the time from the first upswing of pressure to the bottom of the incisura) was greater than the physiological limit (40-45%) placed by these authors. A retouched record from a conscious prone animal illustrating these points is shown in Fig. 1. The guinea pig heart is therefore capable of faster filling and coronary outflow than was described for other small mammals.

Summary. In 8 guinea pigs under local or general anesthesia, systolic and diastolic end pressures in the carotid artery averaged 77 and 47 mm Hg respectively. The calculated mean pressure averaged 57 mm Hg. The portion of the cardiac cycle taken up by systole was greater than that described for other small mammals in about 40% of the measurements.

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Observations on a Pro-esterase Associated with Partially Purified First Component of Human Complement (C'1).* (22376)

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Investigations on the mechanism of inactivation of human complement by plasmin and by antigen-antibody aggregates(1-5) indicated that the first component of complement (C'1) may exist in serum as enzyme precursor. A mechanism of complement-"fixation" was proposed(3-5) in which it was postulated that antigen-antibody aggregates convert C'1 to active enzyme ("activated C'1"), which in turn inactivates the second and fourth components of complement (C'2 and C'4). Although available experimental data are compatible with this hypothesis, direct evidence has awaited studies with purified systems. Our experiments demonstrate that a partially purified preparation of C'1 converts, under certain conditions of pH, ionic strength and temperature, to material which has lost its hemolytic C'1 activity but

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