of inducing the liberation of luteinizing hormone in the constant estrous guinea pig. The closure of the vaginal membrane in the one animal injected with copper acetate and the partial closure in the 4 animals injected with acetylcholine was probably due to the debilitating effects of the injections rather than to a specific action of the drugs since no evidence of ovulation nor of luteinization could be found in the ovaries.

Summary. Lesions of the anterior hypothalamus of the female guinea pig may prevent the secretion of luteinizing hormone. The ovaries of these animals undergo marked follicular development but ovulation and luteinization fail to occur. Injections of copper acetate and of acetylcholine failed to induce the liberation of luteinizing hormone in these animals although several routes of injection were employed.

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Treatment of Circulatory Collapse of Experimental Venous Occlusion: Use of Adrenal Cortical Extract and Saline Solution.

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The appearance of a shock-like syndrome and a high mortality rate has been demonstrated in untreated dogs subjected to occlusion of the venous drainage in one leg.[1,2] It has been reported, moreover,[3] that pre-treatment with desoxycorticosterone acetate (DCA) or with adrenal cortical extract (ACE) lengthened the survival time and, in a number of cases, resulted in complete recovery. Post-operative treatment with DCA, so far as recovery was concerned, proved relatively ineffective.[4]

The crucial problem, however, in an experimental attack upon the control of shock would appear to lie, not in the pre-treatment of incipient shock-like states, but in the contravention of such crises once they have set in. The present report deals with the postoperative use of ACE and of physiological saline, administered only after unmistakable signs of collapse have appeared.

Methods. Animals subjected to venous occlusion in one hind limb by suitable ligation and by injection of lampblack,[2] under pentobarbital anesthesia, were followed during their postoperative course for signs of a failing circulation and of systemic distress; mean arterial pressure (femoral puncture), respiratory rate, pulse, and rectal temperature were recorded at intervals. Symptoms of prostration appeared within a postoperative period ranging from 2 to 8.5 hours (Table I); the mean arterial pressure, for example, had fallen to levels as low as 27 mm Hg., and several of the animals were comatose. The therapy then instituted consisted of intravenous administration of ACE (Eschatin*), 3 cc per kg body weight, supplemented by subcutaneous injection of physiological saline, 4% of body weight.

Results. In a series of 18 experiments there were significant increases in the survival time in 6 animals (Table I, animals 2, 3, 5, 6, 8, 10). Of these, 4 were sacrificed after a 2-3-day survival period, at which time they were in good condition. Although no actual measurements were made, the legs with venous drainage occluded appeared to have undergone some reduction in size. Animal 10 was a complete survival, and 3 weeks after operation was in excellent condition; the limb with venous occlusion had returned to normal size. The survival times

1 Perlow, S., Killian, S. T., Katz, L. N., and Asher, R., *Am. J. Physiol.*, 1941, **134**, 755.

2 Bourque, J. E., and Kotalik, G. C., PROC. SOC. EXP. BIOL. AND MED., 1942, **51**, 371.

3 Katz, L. N., Killian, S. T., Asher, R., and Perlow, S., *Am. J. Physiol.*, 1942, **137**, 79.

4 Katz, L. N., Asher, R., and Perlow, S., *Proc. Cent. Soc. Clin. Res.*, 1942, **15**, 36.

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TABLE I.
Effect of Adrenal Cortical Extract and Physiological Saline upon Survival Time.

Dog	Wgt	Inj. time p.o. (hr)	Mean art. pressure (mm Hg.)	Wt incr. of limb (% body wt)	Survival time (hr)
1	5.7	2.3		6.1	9.0
2	5.2	2.5		2.3†	72.0*
3	6.8	2.08		2.3†	72.0*
4	6.4	3.08	80	1.9	16.2
5	4.1	5.3	53	1.9†	48.0*
6	5.5	8.5	27	4.0†	48.0*
7	7.3	4.0	60	3.9	10.0
8	5.5	2.8	40		72.0
9	3.2	2.8		3.1	21.8
10	5.5	4.4			complete
11	7.3	4.9		3.7	10.0
12	4.1	3.4			10.5
13	4.3	3.9			9.2
14	4.6	4.9	50		23.0
15	4.6	6.0	42		16.75
16	5.5	4.9	32		7.9
17	5.5	2.0			5.8
18	6.4	2.0			9.5

*Sacrificed. †At sacrifice.

of the remaining 12 ranged from 5 hours 45 minutes to 21 hours 50 minutes. In 12 control experiments on untreated animals[2] survival times ranged from 3 hours 45 minutes to 16 hours 45 minutes. In another series of 12 control experiments, ACE alone was injected intravenously (3 cc/kg), without the saline adjuvant. Survival times ranged from 4 hours to 18 hours. In a third control series, 0.9% sodium chloride solution was injected subcutaneously, 4% of body weight. Two animals survived 3 and 5 days respectively. The range of survival times of the remaining 10 ran from 4 hours 45 minutes to 38 hours 15 minutes.†

Data on femoral arterial pressure are inadequate for any judgment as yet regarding their validity as a criterion of collapse and for initiation of treatment. The range at the time of general prostration varied in the limited number observed in this preliminary series. In dog 6, for example, the mean pressure had fallen to 27 mm Hg.; in dog 4, on the other hand, clinically comparable, the pressure prior to treatment was 80 mm Hg. However, dog 6 survived and dog 4 died at the end of 16 hours 15 minutes. It seems highly probable that factors other than a failing circulation are involved in precipitation of irreversible collapse.

The high mortality of the experimental series—since two-thirds survived no longer than the controls, cannot be explained as yet. The dogs were in excellent health preoperatively and treatment was identical in each case; the operative technic, moreover, had been perfected in over 60 dogs prior to this series. The danger of obtaining fallacious values for any given course of therapy, and the need for extended observations, is indicated by the circumstance that the 6 animals with prolonged survival times were obtained in the first 8 animals of the series; had work ceased at that point, a definitely beneficial effect could have been reported in 75% of the animals. As it turns out, the treatment was effective in certain instances, but the nature of the precise determining factor remains to be determined.

Summary. The shocklike syndrome of circulatory collapse and prostration was induced in a series of 18 dogs by a regional venous occlusion. Treatment at the time of collapse, by infusion of ACE and physiological saline, resulted in a marked increase in survival time in 6. In a control group of 12, saline infusion alone prolonged survival time in 2. ACE alone in a series of 12 proved ineffective.

† Statistical analysis shows that difference in survival times of saline treatment and of extract treatment alone, are significant. Saline survivals were longer. No significant difference was found between untreated controls and Eschatin alone.