

(2) If the urine from one kidney is deviated directly into the vena cava by uniting the ureter and lumbar vein, no toxic symptoms appear, the blood N.P.N. remains within normal limits, and there is no rise in the arterial blood pressure. These experiments give no support to the theory of a specific nephrogenic toxin as postulated by Brücke.

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Effect of Cortical Hormone upon Blood Pressure in Shock Induced by Massive Doses of Adrenalin.

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Previous work¹ led to the conclusion that cortical hormone exerts a direct effect upon the low blood pressure in shock induced by stripping the intestine. The pressor action of the hormone appeared to be more or less independent of serum electrolyte and associated blood volume changes. The present experiments on adrenalin shock lend further support to these conclusions.

Five adrenalectomized dogs were used. They were active, vigorous, at peak weight and indistinguishable from intact animals. No hormone was administered 18 hours previous to use in the experiments. Table I shows that they had normal blood pressures, blood concentration and serum electrolytes. These dogs were given 20-40 cc. of either 1-3000 or 1-5000 solution of adrenalin (diluted with either 0.9 NaCl or 5.5% glucose) by continuous or intermittent intravenous infusion. The time interval ranged from 20-60 minutes. The animals were table trained and no anesthetic was used since the slow injection did not cause pain or discomfort. Occasionally a dog would retch or vomit if the adrenalin was given too fast. Arterial pressures were recorded by the needle puncture method² during injection and frequently thereafter. The essential data obtained from study of a representative case are given in Table I.

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¹ Swingle, W. W., Parkins, W. M., Taylor, A. R., and Hays, H. W., *Proc. Soc. Exp. Biol. and Med.*, 1937, **37**, 601.

² Parkins, W. M., *Am. J. Physiol.*, 1934, **107**, 518.

TABLE I.
Effect of Adrenal Cortical Hormone on Mean Arterial Blood-pressure in Adrenalin Shock.

Date	Time, hours	Blood- pressure, mm.Hg.	Pulse, min.	Serum Sodium per liter, m.-eq.	Serum Chloride per liter, m.-eq.	Serum K per liter, m.-eq.	Hemo- globin, gm. %	Red cell volume %	R.B.C., mil.	Remarks
11/18	10:00 a.m.	110	84	146.1	115.8	6.8	12.8	34.5	5.42	Normal—13.6 Kg.
"	11:15-12:15	150	60			(40 cc. adrenalin in 0.9% saline)				
"	12:18	64	128							
"	2:00 p.m.	38	108	154.7	117.8	5.8	13.2	39.7	5.88	Shock Extract* Improvement
"	3:20	55	136							H ₂ O given—no food
11/19	11:30 a.m.	72	108							
11/22	9:30 a.m.	104	92	140.1	103.2	5.5	12.8	34.7	4.50	Appears normal

*3 cc. per kg. cortical extract injected intravenously at 2:05-2:20 on 11/18/37 and 3 cc. per kg. injected in divided doses on 11/19, 20 and 21.

The arterial pressure which is high during adrenalin administration may abruptly decline to a low level shortly after cessation of injection, or the fall may be slow but steady. The animals do not show any signs of revival from shock, unless treated. They are unable to spontaneously raise the lowered blood pressure. Eight intact dogs which received approximately equivalent quantities of adrenalin per kg. body weight, given at the rate of 0.5 cc. per minute, died within 10 hours.

Intravenous injections of large doses of cortical hormone restored the profoundly shocked adrenalectomized dogs to normal health and vigor. The arterial pressure slowly rose to normal and all symptoms disappeared.

Table I shows that changes in blood concentration and serum electrolytes are negligible. The serum Na and Cl concentrations actually increased during shock whereas the K usually remained unaltered. Since loss of blood fluids to the tissue spaces is known to occur in adrenalin shocked intact dogs and cats^{3, 4, 5} some loss of vascular fluids probably occurred in our animals also. However, we do not regard such fluid loss of sufficient magnitude to adequately account for the circulatory collapse in our experiments. Likewise, the marked restorative effect of the hormone upon blood pressure appeared to be largely independent of volume changes.

It is well known that healthy adrenalectomized animals receiving maintenance doses of hormone are peculiarly sensitive to undue stress or strain of any sort, such as slight hemorrhage or mild trauma. A slowly developing, fatal shock supervenes. It is possible by utilizing these shocked dogs and injecting large amounts of potent extract, to demonstrate a direct effect of cortical hormone upon blood pressure.

³ Lamson, P. D., and Keith, N. M., *J. Pharm. Exp. Therap.*, 1915, **8**, 247.

⁴ Erlanger, J., and Gasser, H. S., *Am. J. Physiol.*, 1919, **49**, 345.

⁵ Freeman, N. E., *Am. J. Physiol.*, 1933, **103**, 185.