

that the Q-factor of these various sections may vary among themselves by ratios as great as 1.8:1, the value obtained for any particular section depending, apparently, on its size, shape and internal structure.

Summary and Conclusions. The arm-to-arm segment is shown to be heterogeneous both as to impedance and Q-factor. It follows, therefore, that the Q-factor of this segment cannot properly be assumed to be independent of differences in physical conformation. Q-factor measurements which fail to take into account the possible effect of size and shape are open to serious question.⁵

9302 P

High Intestinal Obstruction In the Dog Treated with Extract of Adrenal Cortex.

MICHAEL G. WOHL, JOHN C. BURNS AND GERHARDT PFEIFFER.
(Introduced by John A. Kolmer.)

From Temple University Medical School.

Acute intestinal obstruction as a representative of a group of conditions that are characterized by hyperazotemia and hypochloremia bears resemblance to adrenal insufficiency.^{1, 2, 3} Indeed, we described the histologic¹ changes of the adrenal glands in the dog with high intestinal obstruction as that of lipoid exhaustion of extreme degeneration of the adrenal cortex.*

In view of Kendal's⁵ separation of 2 fractions of the cortical extract one of which produces results only when salt is administered with it, it seemed desirable to study the combined effect of cortical

⁵ Horton, J. W., and Hertz, S., *Endocrinology*, 1936, **20**, 831.

¹ Wohl, M. G., Burns, J. C., and Clark, J. H., *Proc. Soc. Exp. Biol. and Med.*, 1936, **33**, 543, 546.

² Wohl, M. G., and Brust, R., *J. of Lab. and Clin. Med.*, 1935, **20**, 1170.

³ McCance, R. A., *Lancet*, April 11, 1936, page 829.

* Dr. J. E. Sweet called the attention of one of our coworkers, Dr. J. H. Clark, to the fact that in several of his writings he spoke of the peculiar similarity between dogs that have died after bilateral suprarenalectomy and those from toxic injection.⁴ We are glad to make this correction. However, Dr. Sweet stresses the changes that occur in the medulla of the adrenals and not in the cortex which we are inclined to look upon as one of the chief factors concerned in the disturbed pattern of the water and electrolyte metabolism in high intestinal obstruction.

⁴ Sweet, J. E., *Penna. Med. J.*, April, 1913.

⁵ Kendal, E. C., *J. A. M. A.*, 1935, **105**, 1486.

extract and salt solution in high intestinal obstruction. The amount of salt solution employed was considerably less than previously found sufficient to prevent adrenal exhaustion.

High intestinal obstruction was induced on 6 dogs. The method, the preoperative and postoperative care were the same, as employed previously.¹ Daily blood studies were made for NaCl, urea nitrogen, CO₂ combining power of blood plasma, hemoglobin specific gravity and red blood cell count.

Two dogs received 200 cc. of physiological salt solution intraperitoneally on the day of operation and every day thereafter plus 3 cc. of adrenal cortex extract intramuscularly; 2 dogs had neither cortin, nor salt solution; 2 dogs received daily intramuscular injections of 3 cc. of extract of adrenal cortex.† The dogs receiving adrenal cortex and salt solution lived for 15 days, when they were anesthetized and killed. They showed a loss of weight of 1.3 kilos and towards the last 2 days developed twitchings of muscles of hind legs. The blood urea nitrogen rose from 9.8 mg. % on the day of operation to 21 mg. % on the day of postmortem. The blood chlorides decreased from 510 mg. % to 420 mg. %. The CO₂ increased from an initial 48.5 volume % to 75.3 volume %. The specific gravity remained practically the same. (1.028 to 1.030). The hemoglobin decreased from 14 gm. to 10.5 gm. The red blood cells decreased by 1,470,000. The postmortem and histological findings of the organs as well as those in other dogs will be described elsewhere.⁶ The dogs without salt solution and cortin lived 5 days. They became toxic; vomited on the second day after operation, gradually grew worse and died on the fifth day after operation. The blood urea nitrogen increased from 16.1 mg. % on the day of operation to 144.2 mg. % on the day of death. The blood chlorides decreased from 440 mg. % to 302 mg. %. The specific gravity of the blood increased from 1.025 to 1.043. The hemoglobin has increased from 8.5 gm. to 17 gm. The red blood cells increased by 1,410,000.

The dogs receiving cortin alone lived for 7 days. They lost one kilogram in weight; they apparently were not toxic and on the seventh day developed twitchings of muscles of trunk and of all 4 extremities and died. On this day, an additional dose of 3 cc. of cortin was given without much benefit. The blood changes were as follows: The blood urea nitrogen increased from an initial 14.7 mg. % to 66.5 mg. % on the day of their death; the blood chlorides de-

† We are indebted to Dr. David Klein of Wilson Laboratories, Chicago, Ill., for the supply of adrenal cortex extract.

⁶ Wohl, M. G., Clark, J. H., and Burns, J. To be published.

creased from 480 mg. % to 260 mg. %. The CO₂ increased from 48.1 vol. % to 78.2 vol. %. The specific gravity increased from 1.027 to 1.030; the hemoglobin decreased from 14 gm. to 11 gm., and the red blood cells decreased by 1,300,000.

Heuer and Andrus⁷ prolonged the lives of dogs receiving intravenous injections of aqueous extracts of closed intestinal loops by administering cortical extract combined with transfusion. Scudder, Zwemer and Truskowski⁸ fortified our comparison between the clinical and biological picture of acute intestinal obstruction and adrenal insufficiency by demonstrating high blood potassium values in cats with high intestinal obstruction. This assumes special importance in view of Zwemer's and Truskowski's⁹ findings that symptoms of adrenal insufficiency may be explained in terms of a disturbance of cortico-adrenal-potassium interrelation.

We appreciate that our experiments are too few in number to permit the drawing of definite conclusions, but one would seem justified in emphasizing: 1. The many features in common in acute intestinal obstruction and adrenal insufficiency. 2. The apparent benefit from the combined administration of physiological salt solution and adrenal cortex extracts in combating the toxemia of high intestinal obstruction.

9303

Diffusion of Ions Through Collodion Membranes Treated with Urethanes.

ERIC PONDER AND JULIUS C. ABELS.

From the Biological Laboratory, Cold Spring Harbor.

Anselmino¹ has shown that collodion membranes, made so as to permit a slow passage of thiocyanate ion, have a lowered permeability to this ion when the dialysis system is treated with urethane, and that after the "narcotized" membrane is washed for about an hour with water, the normal thiocyanate permeability is restored. This observation has been frequently used in connection with the thesis that narcotics produce their effects through changes in per-

⁷ Heuer, G. J., and Andrus, W. D., *Ann. Surg.*, 1934, **100**, 734.

⁸ Scudder, J., Zwemer, R. L., and Truskowski, R., *Surgery*, St. Louis, 1937, **1**, 74.

⁹ Truskowski, R., and Zwemer, R. L., *Biochem. J.*, 1936, **30**, 1345.

¹ Anselmino, K. S., *Pfluger's Arch.*, 1928, **220**, 524.