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Prolongation of Life of Dogs with Experimental Intestinal Obstruction.

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Harwell, Hoguet and Beekman,[1] in an experimental study of intestinal obstruction, produced obstruction of the duodenum in a series of dogs, and found that "the 3 dogs which lived the longest were all given saline solution subcutaneously." They injected from 150 to 300 cc. per day. In recent years numerous reports of the beneficial action of saline solution in gastric tetany and intestinal obstruction have appeared. We have undertaken a study of the effect of large quantities of saline solution on the length of life of dogs after the production of an experimental obstruction by the "closed loop" method introduced by Whipple and his associates.[2] We chose this method because it is a very uniform procedure, produces very characteristic results, and has been used widely by experimenters in this field. We have injected large quantities of normal saline solution, 500 cc. for each 7 kilos of body weight, 5 or 6 times a day subcutaneously, to provide fluid and chloride lost by vomiting and to cause a continuous diuresis. By this method we hoped to keep the dogs alive until the "closed loop" became relatively sterile,[3] or some other adaptation might occur.

Under ether anesthesia and using strictly aseptic technique, a "closed loop," 10 to 12 inches long, of the first part of the jejunum was made beginning 5 or 6 inches below the fixed portion of the duodenum and the continuity of the intestine was reestablished by an end-to-end anastomosis.

The length of life of the untreated dogs confirms the findings of Dragstedt, Moorhead and Burcky,[3] and others, namely that such dogs die in from 24 to 96 hours.

At the present time we have results on six treated dogs, which show that the treatment has proven efficacious. Dog 1 lived 86 hours and possibly should be excluded because of rupture of the loop at the line of closure. Dog 2 lived 102 hours (a very large dog). Dog 3 lived 151 hours. Dog 4 lived 163 hours. Dog 5 lived 242 hours (injections stopped 2 days before death). Dog 6 is now alive, 28 days after operation and has not been treated for the last 10 days.

[1] Hartwell, J. A., Hoguet, J. P., and Beekman, F., *Arch. Int. Med.*, 1914, xiii, 717.

[2] Stone, H. B., Bernheim, B. M., and Whipple, G. H., *Bull. Johns Hopkins Hosp.*, 1912, xxiii, 159; Whipple, G. H., Stone, H. B., and Bernheim, B. M., *J. Exp. Med.*, 1913, xvii, 286.

[3] Dragstedt, L. R., Moorhead, J. J., and Burcky, F. W., *J. Exp. Med.*, 1917, xxv, 421; PROC. SOC. EXP. BIOL. AND MED., 1916, xiv, 17.

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The Influence of High and Low Protein Diets on Blood Chemistry.*

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This paper is part of an investigation of the influence of high and low protein diets on basal metabolism, blood chemistry, and the urinary nitrogenous compounds. For a period of 37 days 6 apparently normal women, all engaged in laboratory work, received a high protein diet containing 2 gm. of protein and sufficient carbohydrate and fat to make 40 calories per kilo of body weight. An interval of 3 weeks was then allowed in which the protein intake was lowered until it reached 0.5 gm. per kilo. Although the carbohydrate and fat intake on the low protein diet was adjusted so that the caloric value of the two diets remained the same, all subjects lost weight during the first 10 days. The protein value was then increased to 0.6 gm. per kilo and the weight remained stationary. The low protein diet was continued for 30 days.

All foods were carefully weighed. On 4 days of each week basal metabolism was taken, specimens of blood and urine were collected, and samples of foods were saved and analyzed. Blood was drawn from the cubital vein without turniquet before breakfast, after 30 minutes rest, and was analyzed for sugar, total non-protein nitrogen, urea nitrogen, creatine, creatinine, uric acid, and lactic acid. Total non-protein nitrogen was determined by Koch's method and lactic acid by Clausen's procedure modified by Friedemann. Folin's methods were used for all the other constituents. All determinations were made in duplicate.

No consistent differences were found in blood sugar levels on the two diets. In 3 subjects the blood sugar showed a rise on the low protein diet, but in the other 3 it remained the same on both diets. The average figures for 6 subjects for the 5 weeks on the high pro-

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