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Mechanism of Cataract Formation in Thyroparathyroidectomized Dogs.

CHARLES EISEMAN AND ARNO B. LUCKHARDT.

From the Department of Physiology of the University of Chicago.

This work was suggested by the reported occurrence of bilateral cataracts in old thyroparathyroidectomized dogs.¹ Symptoms of parathyroid deficiency were simulated in normal dogs while observing the lenses of these dogs by oblique illumination, and, by ophthalmoscopy at a distance, with the aid of atropine. The symptoms of tetany were simulated. These were thought by clinicians of the latter half of the last century to produce cataracts,² decreased blood calcium,³ increased blood phosphate,⁴ and an attempted increase in the deposition of calcium.⁵

Tetany was induced by the intravenous injection of oil of wormwood, and the subcutaneous injection of strychnine sulphate. In 18 injections, by the first method, we produced some 49 tonic seizures, and a total of 1 hour and 38 minutes of clonic seizure. The two dogs which lived through this treatment were under observation for 3 months. The dogs receiving strychnine, 20 injections resulting in 26 convulsions, were held 2½ months for observation. Neither method yielded us a single cataract.

We attempted to lower blood calcium by intravenous injection of solutions of sodium oxalate at the level of 30 mg. per kilo, and also Na_2HPO_4 solutions, in doses varying from 0.386 gm. to 0.690 gm. per kilo. The oxalate was given in 1 dose, while the Na_2HPO_4 was given in 3 daily portions. The animals lived only 6 days, but, during this time we could discover no indication of cataract formation.

To increase blood phosphate we administered NaH_2PO_4 solution *per os* at levels from 3.6 to 5.8 gm. per kilo, given as 3 daily portions for 16 days. The Na_2HPO_4 dogs cited above also had received phosphate. We could detect no cataractous change in the lenses as a result of this treatment.

In attempting to increase calcium deposition we reasoned that there must be an equilibrium between the various tissues, including the lens, and that if we added soluble calcium, or increased phosphate, or alkalinized the blood, or combined these methods, we might succeed in depositing calcium, that is, in producing cataracts. These ideas were tested by the intravenous injection of calcium

lactate at levels from 0.04 to 0.06 gm. per kilo; by the intravenous injection of calcium lactate at the level of 0.1 gm. per kilo, and, giving 0.75 gm. of NaHCO_3 *per os*; by the intravenous injection of calcium lactate at a level of 0.09 gm. per kilo, and by administering *per os* NaH_2PO_4 at 0.275 gm. per kilo; by interchanging the routes of the last procedure, giving 0.07 gm. of calcium lactate *per os*, with intravenous injection of NaH_2PO_4 at a level of 0.27 gm. per kilo. These last two groups of dogs lived only one week; the others received treatment, in some cases, for 22 days, and were observed for the following 7 months. No cataracts were seen.

We have negative results only, except that, contrary to the opinion of some clinicians, convulsions (oil of wormwood and strychnine) *per se* did not produce cataracts.

¹ Luckhardt, A. B., and Blumenstock, J., *Am. J. Physiol. Proc.*, 1923, lxiii, 3, 406.

² Graefe-Saemisch Handbuch der gesammten Augesheilkunde, Pathologie und Therapie des Linsensystems, 1911, p. 142.

³ Binger, C., *J. of Pharm. and Exp. Therap.*, 1917-18, x, 105.

⁴ Greenwald, I., *J. Biol. Chem.*, 1913, xiv, 87.

⁵ Burge, W. E., *Arch. Ophthalm.*, N. Y., 1909, xxxviii.

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A Simplified Technique for Hepatectomy.

J. MARKOWITZ AND S. SOSKIN. (Introduced by J. J. R. MacLeod.)

From the Department of Physiology, University of Toronto.

For the past year there has been employed in this laboratory a simplified method for hepatectomy. The technique used is an extension of Mann's method for abdominal evisceration,¹ and is briefly as follows: Through a mid-line incision the inferior *vena cava* proximal to the lumbo-adrenal vein is loosely ligated with stout linen so that about $\frac{2}{3}$ of its lumen is occluded. The portal vein, at its point of bifurcation in the portal fissure, is similarly ligated proximal to its last tributary. The intestine should be mildly congested but not cyanosed, and the ligature only rarely requires to be slightly loosened.

The dogs uniformly make an excellent recovery. The liver is removed at a second operation, which is best done six or more weeks later. The structures in the lesser omentum are tied and cut, as is also the *vena cava* below and above the liver. The intestines do not become cyanosed.