

ions in the surrounding fluids, and a resulting disturbance in colloidal structure of the lens.

Cataract has been associated with parathyroid tetany and a low serum calcium resulting in a change of inorganic ions in the eye fluids which supposedly disturb the colloid equilibrium in the crystalline lens.

It would seem that the perfect transparency of the normal lens must be maintained by an extremely constant balance of inorganic ions and that any interference with the inorganic equilibrium might disturb the colloidal solution and cause some of the proteins of the lens to precipitate.

A number of questions arise as a result of these observations and hypotheses. What other blood and tissue changes are associated with lactose and galactose metabolism? What deficiencies or excesses, if any, will aggravate or hasten cataract development? Is there any food constituent or metabolic product which will protect the capsular membrane against sugar injury?

7928 P

Effect of Rapid Infusion on Venous Pressure: A Test of Cardiac Reserve.

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The response of the heart to increased work is an indication of its reserve strength. This response is measured clinically in various exercise tests, with observation of pulse and respiratory rate changes. These tests operate, at least in part, by increasing the return of venous blood to the heart. A similar mechanism is brought into action by increasing the volume of the venous return to the heart by injecting fluids intravenously. If such fluids are injected rapidly and in large volume, an increased load is put on the right side of the heart.

Since the introduction and widespread use of simple methods of infusion, there has been much discussion of the proper rate of injection of such fluids. In the investigation of this problem, observation of the venous pressure before, during and after the infusion offers the most direct physiological evidence of the ability of the

vascular system to accommodate the rapidly increased blood volume. The venous pressure measurements give a partial indication of the power of the heart to respond to increased load by increased work.

Venous pressures have been measured during infusions given in cases of diabetic acidosis and post-operative shock. Large volumes of fluid have been injected, up to 2,500 cc. of normal saline in one hour, without any alteration of the venous pressure from a normal level. (Table I.) In making these determinations a three-way

TABLE I.
Ma. Case No. 245481. Diabetic acidosis.

| Min. | cc. of saline | Venous pressure mm. of water | Pulse | Arterial pressure |
|------|-----------------|---------------------------------|-------|----------------------|
| 0 | before infusion | 75 | 92 | 112/54 |
| 5 | 200 | 55 | | |
| 10 | 400 | 55 | | |
| 15 | 600 | 57 | | |
| 20 | 800 | 54 | | |
| 25 | 1000 | 57 | | |
| 30 | 1200 | 55 | | |
| 35 | 1400 | 66 | | |
| 40 | 1500 | 70 | | |
| 45 | 1650 | 68 | | |
| 50 | 1800 | 75 | | |
| 55 | 2000 | 85 | | |
| 60 | 2150 | 88 | 106 | 132/70 |
| 65 | 2350 | 87 | | |
| 70 | 2500 | 87 | | 140/80 |
| 75 | — | 70 | | |
| 80 | — | 52 | | 146/78 |

stop-cock has been used connecting the needle in the vein with the infusion reservoir and the venous pressure apparatus (of Moritz and v. Tabora), and pressure readings have been taken at intervals of 2 to 5 minutes.

For extending this method in an attempt to develop an infusion test of cardiac function, the technique used has been to inject 1,500 cc. of normal saline solution into one of the arm veins in 30 minutes, with venous pressure values recorded at 2 minute intervals. In normal cases this has caused no alteration of the venous pressure level during or after the injection. In cases with known heart damage there has been a progressive rise in venous pressure during the injection, and very little tendency to return to the normal level when the injection has been stopped. (Table II.) In intermediate cases there has been a moderate rise in venous pressure during the injection, with a rather prompt fall to the normal level after the infusion.

More than 25 cases have been studied in this way.

TABLE II.
Pr. Case No. 438048. Hypertensive cardiovascular disease.

| Min. | cc. of saline | Venous pressure mm. of water | Pulse | Arterial pressure |
|------|-----------------|---------------------------------|-------|----------------------|
| 0 | before infusion | 70 | 72 | |
| 2 | | 65 | 76 | 140/80 |
| 4 | | 63 | 72 | |
| 6 | | 70 | 72 | |
| 8 | | 82 | 68 | |
| 10 | 550 | 83 | 68 | 145/80 |
| 12 | | 92 | 72 | |
| 14 | | 102 | 68 | |
| 16 | | 108 | 68 | 150/82 |
| 18 | 1000 | 112 | 68 | |
| 20 | | 117 | 72 | |
| 22 | | 123 | 68 | 152/88 |
| 24 | | 122 | 68 | |
| 26 | 1500 | 135 | 68 | |
| 28 | — | 120 | 64 | 160/95 |
| 30 | | 120 | 68 | |
| 32 | | 115 | 64 | |
| 34 | | 110 | 64 | 164/95 |
| 36 | | 110 | 68 | |

From these observations the following suggestions are made: 1. Repeated venous pressure readings during an infusion give a measure of the ability of the vascular system to tolerate the increased volume of blood. 2. Cases of diabetic acidosis and post-operative shock may be given large amounts of fluid intravenously without elevation of the venous pressure. 3. Further work is necessary to show whether a useful test of cardiac function can be developed by measuring the reaction of the venous pressure during and after the intravenous injection of a large amount of fluid in a measured time interval.

7929 P

Viability and Virulence of Frozen and Dried Cultures of Meningococcus.

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One of the difficulties and time-consuming labors in work with the meningococcus has been the maintenance of cultures. Even with Hitchen's semi-solid ascitic fluid agar it is advisable to transfer