

betes in Association with Other Diseases." Some applicants requested a four-day rather than a three-day course. There was also the usual and important comment that speakers should not use slides containing a large mass of fine print that the audience could in no way encompass. The Committee was impressed with the suggestions concerning intermediary metabolism, nutrition and dietetics, a larger consideration of the liver and the blood in association with diabetes, and request for a discussion on normal metabolism of carbohydrates, proteins, and fats. A number of those attending the course requested that printed summaries of each presentation be furnished before the course was given. This entails a great amount of detail in preparation and often is difficult to accomplish.

From a report submitted by a general practitioner in St. Stephen, in New Brunswick, the Committee was much impressed by the awareness of the practicing physician of the need for a higher standard of treatment for diabetes and the desire to learn how to maintain the best possible control. (See footnote page 250.)

For the Third Postgraduate Course which will be held in Philadelphia next January, the Committee has conferred with a number of authorities of the various medical faculties in Philadelphia. It has also requested suggestions from members of the Council of the Association and has carefully reviewed the comments of those in attendance at the two previous courses. From this information the Committee will endeavor to organize a course which will be offered next January that will emphasize normal nutrition, the pathological physiology of diabetes, the diabetic child, the elderly diabetic, new data on the origin of complications, new approaches to diet planning, and certain other highlights bearing on diabetes. The Committee hopes to offer three clinics with presentation of patients.

It has been recognized that the presentation of new data in each course is essential rather than a review of material and information which already is the common knowledge of the alert modern physician.

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THE RAPID INTRAVENOUS GLUCOSE TOLERANCE TEST

Amatuzio and his associates¹ have developed a rapid and practical modification of the intravenous glucose tolerance test.² Twenty five grams of glucose, as a 30 per cent solution in distilled water, are administered intravenously in four minutes. Blood samples are obtained for

sugar determinations immediately before, immediately after completion of the glucose infusion, and thereafter every 8 minutes for 64 minutes. A capillary blood sugar method is used. The loss of glucose in the urine is relatively insignificant during the one-hour period of the test and even in diabetics does not exceed 10 per cent of the amount administered. When the logarithm of the amount of glucose in excess of the fasting blood glucose ("glucose excess") is plotted on semilog graph paper against the time in minutes, a straight line relationship is obtained, from which the disappearance rate of glucose from the blood may be obtained either by graphic means or by calculation. A highly significant difference between normal individuals, mild diabetics, and severe diabetics could be established for the rate of glucose disappearance, expressed as per cent per minute. With diabetes, glucose disappearance rates were uniformly lower than normal. As might be expected, various conditions including obesity, inflammatory disease, uremia, carbohydrate starvation and decompensated portal cirrhosis also revealed a decreased rate of glucose disappearance. The rate of fall of the "excess glucose" depends upon both peripheral utilization of glucose and its storage in the form of liver glycogen. Like other tests the one described in no way differentiates disturbances in storage from those of utilization.

The advantage of this test over oral tests (shared with other intravenous tests) is that changes in gastrointestinal motility and rate of absorption do not influence the results. This test has definite advantages over other types of intravenous testing, such as that developed by Thorn and his associates,³ in that it is less time consuming and the results are relatively independent of the dosage of glucose administered for doses of 25 gm. or more. Another advantage of this test is that any blood sugar method may be used, even those that do not determine true blood glucose. The authors have shown that non-fermentable reducing substances remain constant during the test. Since the error in blood glucose determination is constant and the results are expressed as differences in blood sugar levels, the conclusions of the test are independent of the method used for determination of blood sugar. The test appears to have an excellent reproducibility in the same individual at different times.

The linear nature of the curve indicates that the process of removal of glucose from the blood is governed by the laws of unimolecular reactions, where the rate of reaction varies with the concentration of the reactant. Such conditions would be met if all the mechanisms for removal of glucose from the blood involved diffusion into the intracellular environment,

namely, liver and peripheral tissues. It is of interest that the action of insulin is thought to be exerted upon such a process of diffusion.⁴

With this excellent method three physiological processes have been investigated in man by Amatuzio and his associates.⁵ As might be expected,⁶ 4 units of insulin given with the glucose intravenously were shown to increase the rate of disappearance of glucose from the blood by 110 per cent. In contrast, 0.5 mg. of epinephrine given subcutaneously thirty minutes prior to carrying out the test, led to a 66 per cent decrease in the disappearance rate of glucose. This decrease may be ascribed to increased glycogenolysis⁷ and/or peripheral inhibition of glucose utilization.⁸ While a rise in blood sugar levels following such a dose of epinephrine within 25 minutes and lasting up to 90 minutes had been demonstrated in man⁹ the effect upon the removal of added glucose from the blood had not been previously studied.

The glucose disappearance rate was investigated in 17 patients with moderate to severe hyperthyroidism and was found to be completely unrelated to the severity of the disease. In 15, the rate was high or normal. In 2, it was slow. This is not surprising because of the pathophysiology involved. Peripheral utilization of glucose is increased¹⁰ by the general acceleration of metabolism. Yet glucose storage in the liver is impaired due to a cirrhotic process¹¹ and impairment of beta-cell function from exhaustion is accompanied by a decrease in endogenous insulin production.¹² Thus glucose utilization is decreased. These facts might also explain why after treatment with radioactive iodine, an establishment of euthyroidism in the 15 patients with normal or fast rates of glucose disappearance, this became slower in 8, remained unchanged in 5, and rose slightly in 2, while in the 2 originally showing slower than normal rates of glucose disappearance it became faster in 1 and slower in the other.

The rapid intravenous glucose tolerance test as de-

veloped by Amatuzio and his colleagues lends itself admirably to further clinical investigation because of its relative simplicity, rapidity, and reproducibility.

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BOOK REVIEWS

NUTRITION AND PHYSICAL FITNESS: By L. Jean Bogert, Ph.D., Formerly Instructor in the Department of Medicine, University of Chicago; Instructor in Experimental Medicine, Yale Medical School, and Lecturer in Chemistry, Connecticut Training-School for Nurses, New

Haven; Professor of Food Economics and Nutrition, Kansas State Agricultural College, Manhattan; Research Chemist, Obstetrical Department, Henry Ford Hospital, Detroit. \$4.50, pp. 664, illustrated. W. B. Saunders Company, Philadelphia, Pa., 1954.

The appearance of the sixth edition of this important work on *Nutrition and Physical Fitness* by a recognized