treatment and standards of health for the diabetic. If we as physicians do not urge higher standards for our patients, how can we expect them to strive for them? We need a renaissance in the importance of diet. The diabetic on insulin is living on a subsidy, so to speak, and like people and industries which survive largely because of this type of help, is prone to do as little as possible to help himself.

What qualities must a physician have who accepts the obligations we have discussed? Certainly he should be a man who can face the problem in its broadest aspects and at the same time not be annoyed by details. Furthermore, he should possess infinite patience. It is one thing to maintain an enthusiastic interest in the patient's physical and emotional problems. It is still another thing to instill and perpetuate this attitude in the patient's mind throughout his life. In the apt words of Randall Sprague in his presidential address at the San Francisco meeting, he must administer care for the patient with "warmhearted compassion."

We are facing an obligation of our own making. Its breadth and depth give it great magnitude, but perhaps its very continuity gives us a feeling of inadequacy in fulfilling the obligation.

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DIABETIC NEUROPATHY

In discussions regarding the long-term effects of diabetes, vascular complications are often stressed without adequate mention of other influences of the disease. Judging from end results, the effect of inadequately controlled diabetes on the body is a general one, including a widespread deleterious influence not only on the vascular but also on the nervous system. Emphasizing the not infrequent coexistence of retinopathy, nephropathy and neuropathy, Root (paper before Section of Medicine, American Medical Association, San Francisco, June 22, 1954) has suggested the term "diabetic triopathy."

It is likely that diabetic neuropathy represents a general effect, although the prominent signs and symptoms are most often those of a peripheral "neuritis" involving particularly the lower extremities. In certain patients, as Goodman points out in an article elsewhere in this issue, the manifestations appear to arise chiefly from affection of the femoral nerve. In such cases, pain and tenderness, paresthesias and muscular weakness all reflect the distribution of this nerve. Absence of the patellar tendon reflexes and a positive femoral nerve stretch test (Lasègue's sign in reverse) are other diagnostic points emphasized by Goodman. However, as in Goodman's cases, femoral or other peripheral nerve involvement is often accompanied, followed, or even preceded by other manifestations of neuropathy including "neuropathic foot," paresis of the urinary bladder, "diabetic diarrhea" and postural hypotension. Perhaps paralyses of extraocular muscles should also be included. In patients with diabetic neuropathy, increase in the total protein of the spinal fluid is often found without increase in cells.

As stressed by Goodman, meticulous and consistent control of diabetes is the most important measure in treatment. If histories are carefully taken it will be found that, almost without exception, control of diabetes has been poor prior to the development of neuropathy. It is true that when patients present themselves for treatment the diabetic condition may be under good control and casual questioning will show that this situation has prevailed for some days or weeks. However, more persistent examination will reveal that a long period of neglect preceded this. Then with development of symptomatic neuropathy, the patient on his own took steps to bring the diabetic condition under control only to find that after some weeks the symptoms of neuropathy persisted. Only after this was the physician consulted.

It goes without saying that along with careful control of diabetes, a diet thoroughly adequate in protein, vitamins, minerals and calories should be provided. It is reasonable to supplement the diet with preparations containing vitamin B complex, although no striking beneficial effect should be anticipated from such medication.

When patients with severe pain down the extremities (often worse at night), marked hyperesthesia of the skin, and weakness respond in two or three weeks to the treatment described above, the problem is relatively simple. The patients who "try the soul" of the physician are those who, after weeks and months of careful control of diabetes, still are miserable with persistent symptoms. They represent the real problem of diabetic neuropathy and these are the patients with whom all would welcome more specific therapy. True, experience has shown that in time almost all patients become comfortable (although residua of hypesthesia, impairment of vibratory sense, etc., may be left) and the physician may with confidence give an ultimately good prognosis. However, the patient tires of the weeks or months of continued discomfort and partial disability. The list of agents tried over the years is a long one: vitamin B complex given orally or parenterally, crude liver extract, BAL, pregnant mammalian liver extract and vitamin B_{12}. Physicians who have treated large numbers of patients

over the years can recall certain patients with whom each of these measures seemed to be successful. However, with none of them is relief obtained with any significant degree of uniformity; and in a situation in which various agents appear curative, it is doubtful if any is specific. The last word in the management of diabetic neuropathy remains to be said and the present state of the problem presents a real challenge to all interested in diabetes.

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GALACTOSEMIA, OR GALACTOSE DIABETES

Galactosemia, sometimes called galactose diabetes, is caused by an inborn error of metabolism that leads to inability of the body tissues to utilize galactose. The disorder is characterized by the appearance of a reducing substance in the urine, often mistakenly thought to be glucose but easily identified as galactose, an elevated level of galactose in the blood if the diet includes galactose (as in milk), and concomitant pathologic changes in various organs. First described by von Reuss in 1908,[1] there are now approximately 35 cases reported, but undoubtedly the incidence is much higher than these reports indicate. Since 90 per cent of the recognized cases have been under one year of age, its diagnostic importance mainly concerns physicians who care for infants and children. In an infant under one year of age with reducing substance found in the urine, the diagnosis of galactosemia should be considered before that of diabetes mellitus.[2]

The metabolic defect appears to be in the enzymes that convert galactose to glucose-1-phosphate, either galactokinase or Waldenase:[3]

adenosinetriphosphate + galactose (+ galactokinase) → galactose-1-PO_4 + adenosinediphosphate (+ Waldenase) + uridine-diphosphoglucose (coenzyme) → glucose-1-PO_4 (+ phosphorylase) → Glycogen + PO_4.

Pathologic anatomic changes are most prominent in the liver. In the active stage of the disease, areas of cellular degeneration and necrosis are found, with bile stasis and a peculiar abnormal pseudoacinar grouping of the hepatic cells, sometimes with fatty metamorphosis.[4] In untreated or advanced cases, two types of cirrhosis may appear—the micronodular Laennec's type, and cirrhosis associated with post-necrotic scarring. In the kidneys, the tubular epithelium is swollen, containing what is usually described as glycogen but might be galactogen. In the eyes the lenses often show lamellar or nuclear cataracts.

The cause of these pathologic cellular changes is debatable. Mason and Turner[5] blamed the lowering of blood glucose. But the absence of similar cellular damage in disorders such as glycogen storage disease and hyperinsulinism, associated with low blood sugar, makes this hypothesis doubtful. Several authors have suggested[6, 7] that the elevated blood galactose was a direct cause of the pathologic cellular abnormalities. Some investigators[8, 9] have produced lens opacities in rats by feeding large amounts of galactose. Dam's experiments[10] with the feeding of galactose to chicks led him to the conclusion that galactose damaged the central nervous system. Craig and Maddock[11] have described the production of lens opacities by high galactose diet in rats, associated with failure of growth, increased urinary nitrogen and amino-aciduria, but without hepatocellular changes. The occurrence of abnormal amino-aciduria with galactosemia[12, 13] suggests that the losses of certain essential lypotropic amino acids, due to abnormal renal tubular function, might lead secondarily to some of the pathologic changes in the liver.

Although symptoms of the disorder have been noted usually after an affected infant was given milk feedings, some observers assert that tissue damage may occur in utero.[14, 15] In most patients the symptoms appear at one or two weeks, but in others not until two or three months of age. Persistent jaundice often exists, followed or accompanied by gastrointestinal difficulties, regurgitation, and occasionally diarrhea with yellow stools. The infant often fails to gain weight after being offered several dietary formulae. Drowsiness, lethargy and convulsions may occur. A direct or collateral family history of this disorder may be elicited in approximately 30 per cent of the cases and several reports describe the disease in siblings.[16-18] There is no apparent sex linkage.

The most common physical findings are dystrophy, icterus, pallor, hepatomegaly and lamellar cataracts. Less common findings are splenomegaly, ascites, petechiae with hemorrhagic tendency. Roentgenograms of the long bones may reveal osteoporosis. A loss of the Moro response and absence of tendon reflexes may suggest damage of the central nervous system.

Laboratory tests usually reveal elevated blood galactose, albuminuria and mellituria, often associated with a normocytic hypochromic anemia. The urinary reducing substance is identified as galactose by the formation of the osazone, and mucic acid recovery, and by chroma-