INTRODUCTION

Devastating Effects of Chronic Diarrhea in Childhood

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A survey conducted by the Programme for Control of Diarrhoeal Diseases (World Health Organization, August 1983) has indicated that in 1980 close to 1 billion episodes of acute diarrhea occurred in children under 5 years of age in underdeveloped and developing countries. A significant number of these episodes results in serious retardation of growth and development of affected children. In some of those children in whom diarrhea persists, other complications occur and may ultimately lead to death. It was estimated that 5 million children under 5 years of age died in 1980 from intractable diarrhea. At this rate, 10 young children die from chronic diarrhea every minute of the day, an abstract figure that exemplifies both the magnitude and devastation of its effect.

Infantile diarrhea is a worldwide problem. The underdeveloped and developing countries have a greater incidence and prevalence than do the developed countries. In the majority of cases, the etiology of the diarrheal morbidity and mortality is not identified. Irrespective of the cause, a variety of bacteria, viruses, and parasites have been shown to precipitate the onset of intractable diarrhea. When associated with malnutrition due to previous episodes of diarrhea, excessive morbidity and mortality have been recorded.

Environmental factors, including poor sanitation, contaminated water supply, improper waste disposal, inadequate food processing, storage, and handling, and underlying poor nutrition have been considered to be the initiating and perpetuating factors of infantile chronic diarrhea. The complexity of the problem has only recently been recognized. In considering the major physiologic mechanisms of intractable diarrhea of infancy, we have formulated a working concept by compiling several determinants that have been identified to be crucial (following chapter). Based on our own study, in the majority of cases the final common pathway of intractable diarrhea of infancy is that of prolonged small intestinal mucosal injury. The mucosal injury is caused, intensified, and per-
DEVASTATING EFFECTS OF CHRONIC DIARRHEA

petuated by the associated factors; namely, protein-energy malnutrition, deficient enteric hormones, increased absorption of native foreign protein, ineffective villous repair, bacterial overgrowth, infection, and malabsorption of nutrients.

Diarrheal syndromes are closely associated with severe malnutrition. It is difficult to distinguish the cause from the effect, but it is generally accepted that diarrhea and severe malnutrition form an integrated cyclic event. Many secondary effects may be linked to protein-energy malnutrition. Several alterations occur in the immunological system which result in a general depression of host defenses against infection. Decreased gastric acidity, decreased pancreatic proteases, altered motility, and immunologic deficiencies may result in an increased incidence of infection. This in turn contributes to the vicious cycle of mucosal injury and generalized malabsorption. Severe cases of mucosal injury have been shown to be associated with increased mucosal permeability to macromolecules including native foreign proteins. Extensive damage of mucosal surface presumably would lead to decreased mature epithelial cell populations including entero-endocrine cells. When the proximal intestine is involved, it may result in a decrease in enteric hormones. The intricate relationship between the various determinants and their secondary effects is extremely complex. Few of these determinants, if any, have been investigated to the extent required to permit definitive assessment of their relative contributions to the ultimate outcome in any individual.

The thrust of this conference and its proceedings is to analyze these multiple factors, such as nutritional status, growth velocity, recurrent infections, gastric acidity, motility of the gut, exocrine pancreatic and biliary function, small intestinal absorptive, secretory and reabsorptive capacity, small intestinal immunity, and colonic salvage. The emphasis has been on the integration of basic studies of gastrointestinal pathophysiology, nutritional status, and patient management, and their possible impact on the development of chronic diarrhea and the death of the child. The aim has been to provide a better understanding of the series of interacting events that leads from acute to chronic intractable diarrhea in infants and young children so that an efficient therapeutic approach to the management and nutritional rehabilitation of these infants can be designed to decrease the morbidity and mortality from this disease. Chapters have also been included which present the available data on recurrent episodes and prolonged diarrhea in infants and young children. The book has been structured to stimulate those who care for the afflicted children as well as those in research to determine the multiple factors involved in the intractability of diarrhea. It is hoped that these discussions will provoke increasing interest in what must be a continuing research priority—the relief of the most devastating health problem in children less then 5 years old worldwide.