Vitamins in Gastro-Intestinal Disease *

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Optimal nutrition can contribute much towards a trouble-free human life. The American dietary is considered to be remarkably inadequate. I am tempted to quote a popular commentator who advised, "How to starve to death on three meals a day." He undoubtedly meant vitamin starvation, and he surely meant American meals. That is why optimal nutrition has so much to offer us. Of course, nutrition concerns other substances besides vitamins, indeed minerals, and the protein building stones, amino acids, are fully as important.

Most stress has been placed on the deficiency of Vitamin B1, which is undoubtedly true. But there can be no doubt that Vitamin C and D deficiencies are equally as prevalent, although more difficult to diagnose.

Added vitamin intake besides the minimum requirement is advisable in the following conditions:

1. Malnutrition and starvation.
2. Conditions involving the growth, development or repair of tissues (Lactation, infancy and childhood, convalescence, pregnancy).
3. Prolonged or wasting illness (tuberculosis, cancer, anemias, blood dyscrasias, plasteritis).
4. When the total metabolism or total food intake is increased (high caloric diet, hyperthyroidism).
5. Chronic gastro-intestinal disorders (gastric ulcers, constipation, colitis, ulcer, visceroptosis, sprue, pellagra).
6. Restricted therapeutic diets (diabetes, obesity, low residue, ulcer, ketogenic diets).
7. Some skin diseases.

Vitamin deficiency may be due to many causes. The most important cause is inadequate or improper food intake. The vitamin is taken in with the food and under absorption and taken to the liver by the blood stream, where other changes occur. These are necessary so that the vitamins may be readily utilized by the cells of the body. It can easily be seen that vomiting, diarrhea or anorexia would allow inadequate vitamin-containing substances to be present in the gastro-intestinal tract for an adequate amount of absorption. The diarrhea may be due to frequent catharsis, idiopathic steatorrhea, ulcer, or ulcerative colitis. Absorption may be diminished also, in any illness which changes the character of the absorptive surface, such as polyposis, ulcerative colitis, or sprue. Then again, the liver processes and stores some of the vitamins. Any serious disturbance of the liver itself will disturb the vitamin content of the body and produce a deficiency.

It is almost certainly true that some bodily states require more vitamins than others, especially those conditions that require the growth, development and repair of bodily tissues (pregnancy, lactation and convalescence from illness) and also where there is an increased metabolism of tissue (hyperthyroidism). Then there is also an often unrecognized cause of deficiency which will be discussed in some detail later in this paper; these consist of toxins no matter from what source, whether they are bacterial or drugs, tend to increase the need for vitamins, and some of the vitamins at least, have a protective action against these toxic substances.

Let us rapidly review the early signs of some of the vitamin deficiencies. Early Vitamin A deficiency manifests itself as night blindness and dryness of the skin. In the eye, the regeneration of the visual purple is delayed, the eye becomes increasingly insensitive to light and night blindness ensues. Since considerable Vitamin A is stored in the liver in people who are well nourished, it is unlikely to cause much difficulty unless the patient has been ill for a long time. Vitamin B complex deficiency, on the other hand, is quite a different matter. The content of Vitamin B complex deficiency, on the other hand, is quite a different matter. The content of Vitamin B complex deficiency, on the other hand, is quite a different matter. The content of Vitamin B complex deficiency, on the other hand, is quite a different matter. The content of Vitamin B complex deficiency, on the other hand, is quite a different matter.

Thiamin, riboflavin and nicotinic acid are all considered to be important enzymes in carbohydrate metabolism. Thiamin deficiency causes the well known conditions of dry and wet beri-beri, but these are far advanced states and rarely concern us. The conditions that are sometimes found in this country due to marked Vitamin B complex deficiency are the so called alcoholic and pregnancy polyneuritis, and an interesting dilatation of the heart with cardiac failure, called beri-beri heart. Williams, Mason and Wilder (1) deprived twelve cheerful and cooperative workers of thiamin in their diet for approximately ten weeks. They showed gross changes of behavior, marked changes of attitude, no inclination to do customary tasks and an inability to make social adjustments. They became irritable, sensitive to noise, and lost their manual dexterity. A half milligram to one milligram of thiamin per thousand calories of food brought about great improvement in

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the physical and mental condition of these subjects. The therapeutic implications of these symptoms are obvious.

Riboflavin deficiency causes abnormal redness of the lips, fissures at the corners of the mouth, and a vascularization of the cornea. It also produces a certain atrophy of the tongue which is said to be characteristic of this deficiency. However, at least one authority (2) states that he could not differentiate the glossitis of riboflavin deficiency from that of nicotinic acid deficiency.

Nicotinic acid deficiency causes diarrhea, glossitis, skin changes and mental changes. A very early sign of this deficiency is that the slightest stimulus produces an exaggerated response, i.e. taking of blood from the vein is complained of as severe pain which may continue for hours.

Vitamin C deficiency if fully present, results in scurvy. This is rarely seen, but sub-clinical deficiency is often present; either brought out by some infection, following an operation, or brought out by sensitivity to certain drugs. Following an operation a delay in wound healing may occur, since the principle defect in Vitamin C deficiency is a poorly developed intercellular cement substance.

Vitamin D helps in the absorption of calcium from the intestinal tract and prevents rickets. Vitamin E may be effective clinically, and has been used in such widely divergent conditions, as amyotrophic lateral sclerosis and repeated abortions. Its effect in both of these conditions is disputed.

Vitamin K is a recent significant discovery. It is widely distributed in many foods. However, it requires bile salts for proper absorption and requires them in adequate quantities. Following absorption, the liver cells turn Vitamin K into prothrombin. Biliary obstruction leads to prothrombin-lack because of the absence of bile salts in the intestinal tract. Liver disease would also cause a deficiency of prothrombin, because the liver would be unable to change Vitamin K into prothrombin. Faulty absorption of Vitamin K from diseases such as ulcerative colitis, intestinal obstruction, and idiopathic steatorrhea may also result in prothrombin deficiency.

Certain principles in the treatment of vitamin deficiency may be enunciated. Oral vitamin intake is advisable whenever possible, because the purified vitamins used for injection lack many of the factors found in some of the cruder forms used orally. Some individuals require more vitamins than others. Besides this fact, many authorities do not agree on the prophylactic and therapeutic amounts necessary.

It may be worthwhile to list here certain recent advances in the vitamin field. Chesley (3) recently observed that certain symptoms in some of his patients cleared up on administration of Vitamin B complex. There were epigastric distress, constipation, flatulence, starch intolerance, alternating constipation and diarrhea, fatigue, bloating, nervousness, anorexia, skeletal pains and sensitivity to specific foods. These were considered functional disturbances due to Vitamin B deficiencies. Obviously, organic changes must be ruled out very carefully before assuming the more benign condition to exist.

Laporte and Golden (4) reported the following findings in describing the syndrome that they believed was due to Vitamin B complex deficiency:

Flat dextrose tolerance curve, abnormal small intestinal pattern in the X-ray, malnutrition, hypo or hyperchlorhydria, glossitis, dermatitis, and anemia. The roentgenogram of the small intestines in Vitamin B complex deficiency was further described by Golden. He found hypermotility and hypertonicity in the early stages, hypomotility and hypotonicity in the later stages. There was abnormal intestinal segmentation, a scattering of the intestinal contents, and intestinal gas due to impaired mucosal absorption. Mackie and Mills (5) found that these roentgenographic changes have a definite diagnostic value, they parallel the severity of the disease, and they regress with vitamin therapy.

Vitamin C:

It is questionable whether ascorbic acid deficiency has an etiological relationship to the formation of peptic ulcer. Peptic ulcer is not considered to be a deficiency disease per se, at least not that of Vitamin C. However, the importance of the vitamin in the prevention of hemorrhage, once peptic ulcer has been established, seems clear. Portnoy and Wilkinson (6) noted severe degrees of undersaturation of Vitamin C in persons that had bleeding peptic ulcers. Ingalls and Warren (7) believe it is important to make certain that peptic ulcer patients receive adequate amount of Vitamin C. This deficiency was especially noted in patients with peptic ulcer that were given alkalis. They also considered the effect of the vitamin in the healing of the ulcer. Warren (8) recommends 200 mg. of ascorbic acid daily for about 2 weeks. Others state that 1 to 3 Grams of ascorbic acid are usually required to correct the deficiency.

The effects of Vitamin C on adverse reactions to drugs are extremely interesting. The effect of ascorbic acid on the sensitivity to neoarsphenamine is well known, and has been repeatedly described (9). It is unknown whether the patients exhibiting the actions are deficient in Vitamin C, or whether Vitamin C detoxifies the neoarphenamine in a well saturated patient. Recently, I described a case of rheumatic fever that rapidly became intolerant to salicylates and had a low ascorbic acid content of the serum; this patient was quickly relieved of his disability by adequate intake of Vitamin C (10). This was also shown to be true for several cases exhibiting intolerance to sulphonamides, and more recently to stilbesterol (11). These experiments remain to be further verified. They are certainly interesting if they can be shown to be true.

REFERENCES