

Reprinted from

THE JOURNAL of THE AMERICAN COLLEGE of PROCTOLOGY
448 South Hill Street
Los Angeles, California

VITAMINS AND THEIR RELATION TO DEFICIENCY DISEASES OF THE ALIMENTARY TRACT

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IN THE CONSIDERATION of rectal and intestinal troubles, using the simple words instead of the more scientific and possibly more elegant term, syndrome, which might be more fitting, we have observed throughout many years conditions of deficiencies of specific food substances. These deficiencies alter the normal metabolism.

The metabolism of the human body, being an animal function, is a breaking down process of constructive metabolism of plant life. The animal or human body cannot synthesize organic compounds from inorganic sources and is dependent, to a great extent, on vegetables for organic food. Vitamins as catalysts are one of the most important of these food substances.

When we consider that vitamins in the food are the substances with which the endocrines are able to secrete their active principles, it is apparent that a glandular insufficiency may take place in the absence of vitamins. Vitamins are a class of organic compounds that are probably the most complex food constituents. All of the ductless glands, the thyroid, para-thyroid, thymus, pineal body, pituitary, adrenals, gonads, pancreas, islets of Langerhans, and spleen must have one or more of the vitamins in order to secrete their vital fluids, and, if deprived of the vitamins, will atrophy and cease to function.

It is difficult to give a definite evaluation of the role of single vitamins or specific food substances needed for normal metabolism. The evidence given by all investigators of vitamin deficiencies, point toward multiple deficiencies over a protracted period of time. The difference between enough and not enough in the earlier stages is not always apparent. These deficiencies occur despite a balanced diet, the balance of which is usually determined to a great extent by older knowledge of nutrition, and influenced by conditions in commercial preparation and preservation or cost beyond the control of the average person. We may further find that foods in certain areas are from a vitamin deficient belt just as we know of the iodine deficient belt in the Great Lakes basin today.

The action of vitamin A is principally upon the epithelial surfaces, the skin and mucous membranes, and in fact all of the lining surfaces

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from mouth to anus. Vitamin A protects us from infection at every point through which it might enter the body. Vitamin A deficiency, by its action of increasing epithelial irritability and infectability, can be an important factor in the cause of ulcers. Sure, (1) discussing the cause of stomach ulcers says, "Deficiencies of Vitamins A, B and D, cause a progressive loss of power of the body surface to control the bacterial life in contact with it." Stomach ulcers are probably the best instance of bacterial invasion primarily due to a lowered resistance resulting from a vitamin deficiency. Other instances of vitamin A deficiency, and often found in conjunction with infections of the intestinal tract, are infections of the eyes, tonsils, sinuses, lungs, buccal and lingual mucosa, and the skin. In a history of a patient with colitis or ulcerations in any part of the intestinal or rectal tract, oral and skin lesions are often present and there is usually a picture of low plasma protein, inverted albumin-globulin ratio, low serum calcium and a total low base in the blood determination. [Mackie, (2)].

Richards (3) has shown that the earliest macroscopic signs of disease in vitamin A deficient rats are to be seen in the digestive tract. Inflammation of the small intestines and cecum is frequent and the glandular portion of the stomach shows pitting and ulcerations, the digestive lesions occurring after three or four weeks on a deficient diet. Mackie and Pound (4) have corroborated this with x-ray evidence in the human subject. "When deficiencies are present in an advanced degree they have been invariably associated with characteristic changes in the small intestine." Other vitamins when deficient give indications similarly, attesting to the related and cooperative action.

Vitamin B deficiency can be considered an important factor in the cause of hemorrhoids. It is essential to the maintenance of tonicity of muscular tissue in general, and a deficiency results invariably in a dilation of vascular walls through the effect upon the muscular layer. This is born out by Etzel (5), who states that "Megaesophagus and megacolon are two abnormalities that frequently co-exist with polyneuritis, disturbances of the gastric chemism (anachlorhydria and hypochlorhydria), dysphagia, and constipation. Changes in the electrocardiogram are also seen in beriberi, both in man and in animals. Megacolon was produced in animals with avitaminosis B."

We can therefore draw the conclusion that the enlarged flabby colon and esophagus are due to a deficiency of B by its resulting loss of muscle tonicity, partial failure of elimination, with obstipation as the end result. It is an established fact that vitamin B contributes to the nutrition of the pituitary. It is more than probable that both the vasopressin and oxytocin of the pituitary are produced in normal amounts where B is available. The deficiency of vasopressin plus the nerve malfunction attributable to B deficiency can easily be responsible for the venous dilation, relaxation and congestion that is necessary for the development of hemorrhoids. It is a universal characteristic of B deficiency that the vascular system becomes dilated and degenerated, smaller networks disappearing, large vessels becoming larger.

Vitamin C is essential to the health of the endothelium. This includes the intima of the blood vessels. Takahashi, (6) noted a pronounced lowering of resistance to bacterial infection in his animal experiments in B and C deficiencies. In C deficiency, capillary hemorrhages are characteristic. In fact, the use of the capillary strength as a test for C deficiency is at present recognized as a reliable method. This also contributes to the destruction of the small networks or plexuses. "Rats stunted by B deficiency have bone lesions, that are identical with those in guinea pigs suffering from acute and uncomplicated scurvy, C deficiency. Marrow elements are destroyed and replaced by reticular tissue supporting widely dilated, congested blood vessels." [Shipley, McCollum, and Simmonds, (7)]. That reference demonstrates the cooperative action of vitamins B and C, both being essential to vascular health, degeneration occurring in the absence of either. Deficiency of vitamin B invariably results in relaxation of the muscular walls of the stomach or ptosis, (one of the causes of loss of appetite) and enlargement in general of the intestinal tubes, with impairment of peristalsis. Less conspicuous, but no doubt no less consistent, is the vascular atony, and the slowing of the heart that has been suggested as a specific test for B deficiency, [Burch (8)]. That is probably a consequence purely due to this dilation. It must be recalled that the pulse rate slows whenever an artery and vein are experimentally interconnected, to demonstrate the physiologic law that the heart tends to move a constant volume of blood, the pulse rate and pressure both rising against arterial construction and vice versa.

In vitamin D deficiency we note the low serum calcium. Dietary calcium is not absorbed and no calcium is made available in the serum calcium of the blood for the tissues. Glands supplying digestive fluids require considerable calcium according to Clouse (9). "Vitamin D might bring about increases in blood calcium and phosphorus either by increasing the excretion through the kidney or intestines or both." It is noticeable that nervousness and irritability are occasioned by low serum calcium.

Nervous imbalance and paralysis were noted by Evans & Burr (10) in the absence of vitamin E. This is probably due to one of the actions of vitamin E concerned in mineral metabolism. Vitamin E promotes the supply of magnesium and calcium to the tissues. The mineral supply to the different organs are, no doubt, controlled by the different vitamins and by a process of biochemical affinity the organs select some specifically useful molecules, which brings to mind some of the points in the law of homeopathy. This mineral metabolism control of the vitamins may have some bearing on the report made recently by Dr. Davidson to the A. M. A. Convention, Atlantic City, where he gave evidence of cure of cancer induced by tar in rats, with the use of vitamin E. Magnesium deficiencies have been pointed out as a possible cause of cancer by some investigators, but it is more probable that vitamin E is of greater concern. Cancer having a particular affinity for the intestinal and rectal tract, may



be caused by a systemic deficiency, lowering the resistance to a point where the degenerative process begins.

Little is known of vitamin F but it seems to be concerned with calcium metabolism. A dry skin and some anemias are thought to be caused by deficiencies of F.

It will be seen from the foregoing that vitamin deficiencies may be a factor worthy of consideration in infections, degenerations and malignancies. Therefore, when the conditions of deficiencies are recognized and local treatment is administered to the infected areas, the conditions bringing about the deficiencies should be adjusted. The diet should contain quantities of fresh vegetables, eaten as nearly in the natural state as possible and few refined foods should be allowed in the regimen. Concentrates of the vitamins are a valuable aid in correcting the acute stage in which the patient is found when symptoms develop. There are several good vitamin preparations on the market, but with the matter of economy as well as the fact most deficiencies that occur are multiple, rules out the use of the vitamins in a single concentrate. With the use of one single vitamin, some improvement will occur, but may then be arrested, and no further improvement will follow until the balance be established by administration of additional supporting vitamins. I have had very good results in a number of patients on a group vitamin concentrate tablet with all the vitamins present. This is effective and is not too expensive to the patient.

Much clinical and laboratory work has been done on vitamins, but much more remains to be done before we have a thorough picture of the part vitamins play in normal health. However, without newer knowledge of nutrition, our present knowledge of the effects of vitamin insufficiency, and the availability of some promising concentrates, we can proceed to effect a greater percentage of cures, than has heretofore been possible.

It behooves every medical man to study and observe the merits of vitamin therapy. Only superior knowledge of the worth and the use of this valuable addition to our armamentarium will enable us to protect humanity from its indiscretions, especially by excessive vitamin self-medication.

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Reprint No. 2

Price - .05¢

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Milwaukee, Wisconsin 53201