

The Skeleton in the Hospital Closet

As awareness of the role of nutrition in recovery from disease increases, physicians are becoming alarmed by the frequency with which patients in our hospitals are being malnourished and even starved. One authority regards physician-induced malnutrition as one of the most serious nutritional problems of our time.

by CHARLES E. BUTTERWORTH, Jr., M.D.

In recent years there has been growing concern over the rapidly mounting costs of hospitalization. In 1968, for example, short- and long-term hospital care costs were \$20,751,000,000 in a total national health expenditure of \$57,103,000,000, according to the Office of Research and Statistics of the Social Security Administration. Obviously, enormous savings could be achieved if hospital stays could be shortened by even a day, or prevented altogether. Under these circumstances it seems strange that so little attention has been paid to the essential role of good nutrition in the maintenance of health, and particularly in recovery from acute illness or injury. Stranger still, however, is how frequently one sees the hospital stay prolonged and the patients' suffering made worse by what we are now recognizing as frank mismanagement, if not downright neglect, of the patients' nutritional health in our hospitals.

I am convinced that iatrogenic malnutrition has become a significant factor in determining the outcome of illness for many patients. (Since "iatrogenic" is merely a euphemism for "physician-induced," perhaps it would

be better to speak forthrightly and refer to the condition as "physician-induced malnutrition." I suspect, as a matter of fact, that one of the largest pockets of unrecognized malnutrition in America, and Canada, too, exists, not in rural slums or urban ghettos, but in the private rooms and wards of big city hospitals.

Having patients in our hospitals who are malnourished or starving only because they are there may be nothing new. Perhaps it has always been so. Perhaps it's getting worse because of the rapid depersonalization of patient care. One thing seems certain, and that is that any physician who can recognize the signs and symptoms of malnutrition and starvation will have plenty to observe if he'll look around any large, city hospital.

Surely, the general public, most physicians, dietitians, nurses and others involved in patient care share the conviction that when a sick person commits himself to the total, unquestioning care of his doctor, his nutritional health, at least, should be assured. Entering a hospital and placing oneself in the hands of doctors engenders a feeling of security akin to that experienced by a fugitive when he reached the sanctuary of the cathedral doors in legendary times. Certainly one doesn't expect to suffer because of the experience. Yet, there is evidence that many people do, as I will show shortly with case histories.

I believe that we are beginning to

see the inevitable consequences of the neglect of nutrition education in our medical schools. While the principles of good nutrition are practiced in some institutions and by some individuals, this seems to be the exception rather than the rule. It is, therefore, fallacious for either the public or the medical fraternity to assume that good nutrition is automatically provided to hospitalized patients in this country.

I find this situation particularly tragic in the face of the technological advances that have been made in some highly specialized areas of medical, nursing, and dietetic care. It is well known, for example, that malnutrition interferes with wound healing and increases susceptibility to infection. It thus becomes imperative to ensure that preventable malnutrition does not contribute to the mortality, morbidity, and prolonged bed-occupancy rates of our hospital population. So it's time to swing open the door and have a look at this skeleton in the hospital closet.

During the last several years I have been involved in the training of medical students and house officers, as well as in the evaluation and care of hospitalized patients. This has given me the opportunity to observe the actual practices as they are carried out under a physician's orders. Some of the patients I observed were desperately ill with complicated illnesses; others had relatively minor or straightforward problems. I have been concerned that not enough attention is being given to

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the overall nutrition needs of many patients. A patient entering the hospital should know that he is served by people with understanding and willingness to put into practice the basic nutrition principles, i.e., to look to such matters as caloric requirements, vitamin and mineral equilibrium, and protein requirements under the stress of injury or infection. Somehow the fulfillment of these needs seems to be regarded as divinely assured, simply because the patient had reached the sanctuary of a hospital.

I am not speaking of any one hospital in these observations. I have had the opportunity to visit a number of hospitals, and to discuss the situation with many physicians and nutrition scientists. As a result, I am convinced that the problem of hospital malnutrition is serious and nationwide.

Let me cite a few cases from my own experience which I think are representative of a national problem.

Case #1

An 80-year-old white male was ad-

mitted to the hospital because of ischemic gangrene of the left foot and toes. During the previous year a diagnosis had been made of multiple, small brain-stem infarctions caused by arteriosclerosis. As a result, he had had difficulty in swallowing, and his food intake had been limited for several months prior to his admission. There had been an unspecified loss of weight; but he did not appear to be grossly undernourished. He was mentally clear and alert.

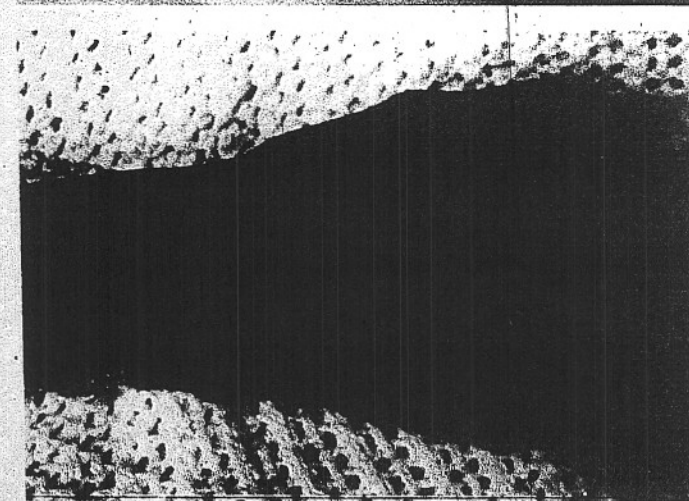
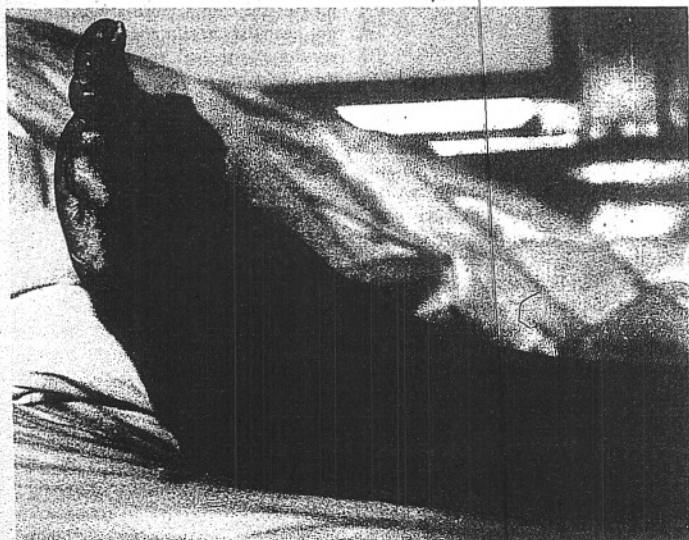
The day after he reached the hospital, he was operated upon. A distal aortic prosthesis was implanted and, through a separate incision, a segment of femoral artery was replaced in the left mid-thigh. Recovery and wound-healing were uneventful, although he did require some ventilatory assistance from time to time.

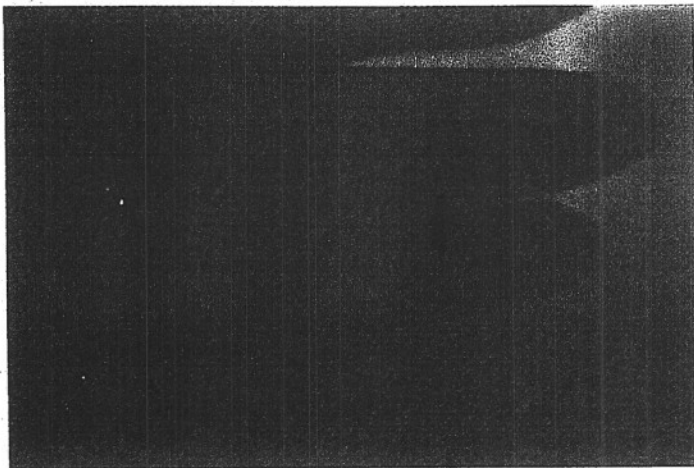
Five weeks later an elective gastrostomy was performed to facilitate feeding. On the eighth day after the opening was made in his stomach, the sutures were removed; a few hours later the wound opened, exposing and spilling the abdominal contents. The incision was resutured at once under general anesthesia. At the time of this repair, the surgeon commented that, from the look of its edges, the incision appeared to have been freshly made and showed no evidence of healing.

Four days later, on the 50th hospital day, the patient was started on an injectable multiple vitamin preparation. Prior to this time he had received no oral or parenteral vitamin supplement of any kind. He had been maintained primarily with infusions of glucose and saline, limited quantities of food taken orally, and small feedings through the gastrostomy. The chart indicated a low level of serum folate (1.48 mg/ml) at this time by the *L. casei* method. But note this crucial fact: the multivitamin supplement ordered did not contain folic acid—the only vitamin in which the patient was then proved deficient.

A nutrition consultation was requested on the 51st day. Only then was it discovered that the patient's body height and weight had not been recorded at any time during his hospital stay. There was evidence of a great deal of recent weight loss, excessive capillary fragility, and a suggestion of perifollicular petechiae. Blood levels of ascorbate (vitamin C) and other vitamins were not measured because he had received two injections of the multivitamin prep-

mitted to the hospital because of ischemic gangrene of the left foot and toes. During the previous year a diagnosis had been made of multiple, small brain-stem infarctions caused by arteriosclerosis. As a result, he had had difficulty in swallowing, and his food intake had been limited for several months prior to his admission. There had been an unspecified loss of weight; but he did not appear to be grossly undernourished. He was mentally clear and alert.





Scaly, desquamating, hyperpigmented skin lesions of the hand and fingers in a young juvenile-onset diabetic following a two-month period of inadequate dietary intake (Case #4).

aration, and it was considered more important to continue therapy than to attempt further diagnostic procedures. It was our impression, based on clinical grounds, that this man was suffering from protein-calorie malnutrition and scurvy. A program of tube-feedings with a balanced commercial product was started, along with a comprehensive program of parenteral vitamins, including high doses of vitamin C. The wound healed uneventfully. The patient became partially ambulatory. And he was discharged almost a well man about two weeks later.

Comment—Notable among the deficiencies known to inhibit wound healing are protein, zinc, and vitamin C. There was no clinical or laboratory evidence of zinc deficiency, and he apparently had been able to mobilize enough protein from tissue stores to maintain serum protein at a normal level. Robert Hodges and his associates, then at the State University of Iowa, have shown that vitamin C depletion can occur within forty days in normal human subjects on an ascorbate-free diet.

The patient described above had probably been on a low ascorbate diet for many weeks prior to admission, because of his difficulty in swallowing. It is of incidental interest that vitamin C and folate tend to occur together, for example, in orange juice and certain fresh vegetables. It is also of interest to note that vitamin C tends to protect

animals from stress, probably because it plays a role in the formation of adrenal corticosteroids. The adrenals contain ascorbic acid in higher concentration than any other body tissue. In addition, there is evidence that many drugs commonly given to hospitalized patients increase vitamin C requirements. Among these are aspirin, barbiturates, paraldehyde, diphenylhydantoin, and ether. Thus, a patient whose stores of vitamin C are marginal could become frankly deficient in that vitamin by the stress of illness, by the requirements

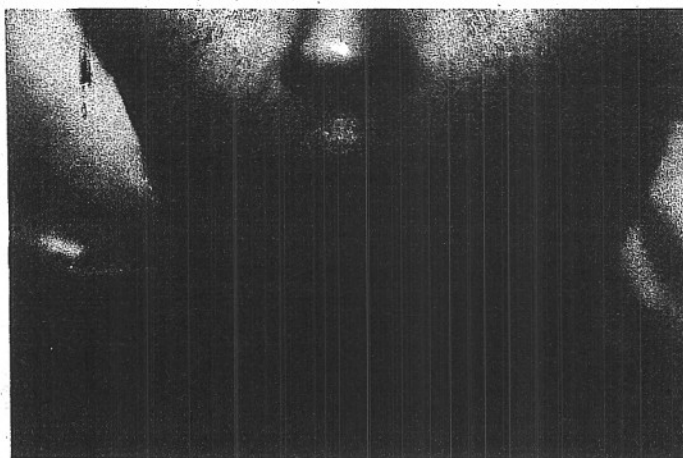
of wound-healing, and by the administration of drugs or anesthetics that require ascorbate for detoxification and excretion. It seems likely that in the case described above, nutrients were mobilized to permit adequate wound healing after the first surgical procedure, but tissue stores were exhausted by the time the second operation was carried out.

Case #2

Some twenty years before he was admitted to the hospital, a 52-year-old man learned that he had aortic and mitral valvular heart disease. Three years before admission, he developed progressive cardiac failure which could not be satisfactorily controlled by conventional medical measures. At the time of admission for elective open-heart surgery, he was described as "emaciated." His body weight was 90 kg (120 lbs.) compared with his usual weight of 105.4 kg (135 lbs.) He was found to have a bicuspid aortic valve and a ruptured *chorda tendinae* of the anterior leaf of the mitral valve. Each was replaced with a Starr-Edwards ball-valve plastic prosthesis.

Postoperative management was complicated by pleural effusion, a contamination of the mouth and esophagus with candida fungus, fever, bloodstream infection with an opportunistic organism (*Serratia marcescens*), anorexia, and anemia, with low levels of serum iron. Eight weeks after the surgical procedure, he weighed only 40 kg

The tongue of a 25 year-old woman with multiple nutritional deficiencies seven months after ileal bypass surgery for obesity had been performed (Case #5). The patient complained of a sore, dry tongue and lack of taste. She subsequently was found to have abnormally low levels of serum zinc and folate.



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(88 lbs.) This represented a loss of 14.5 kg (32 lbs.) from the pre-operative weight. It was more than 40 percent below his usual weight. During this time he had been given regular low-salt meals, but a great deal of the time, he had been unable to eat. Review of the record indicated that, with the exception of small doses of folic acid given because of hemolytic anemia, he had not received any oral vitamin supplementation, for at least the 35 days he spent in the medical intensive care unit! At this time he appeared cachectic; muscle wasting was obvious. There was minimal glossitis, along with extensive purpuric lesions on the skin, particularly at injection sites. Scalp hair was easily pluckable and came out abundantly by the handful. Our diagnosis was adult marasmus, or protein-calorie malnutrition. With full awareness that his malnutrition might be irreversible, he was placed on a program of comprehensive parenteral nutrition for approximately ten days. However, the patient developed fever, multiple pulmonary infarcts, shock, respiratory failure, and died on the 83rd postoperative day.

Comment—This man probably represents a classic case of iatrogenic, or perhaps more accurately called hospital-staff-induced, protein-calorie malnutrition which resulted in terminal starvation. It is well established, but not adequately appreciated, that such patients withstand infection and injury poorly. For example, Nevin S. Scrimshaw at M.I.T. and others have shown clearly that minor infections, even measles, can readily kill a malnourished child, although the true cause of death, malnutrition, seldom appears on the record or in the statistics in such cases. The result, as in this case, is that undue reliance is placed on antibiotics and little or no attention is paid to the factors that nourish the immune mechanisms and support the repair process.

This patient should have been given comprehensive nutritional support in the early postoperative period, possibly even before the surgical procedure. I venture to suggest that he would have survived if this had been done. It is particularly distressing to observe that, in the case just described, an elegant and technically complex open-heart surgical procedure was successfully performed, at great expense to the American taxpayer, yet, in my opinion, the patient died primarily from a failure to

provide his fundamental nutritional requirements.

Case #3

A 46-year-old male with a past history of alcoholism and lead poisoning developed chronic diarrhea and lost approximately 22.8 kg (50 lbs.) during the six months prior to hospital admission. Physical examination revealed bilaterally symmetrical scaly dermatitis of wrists, hands, ankles, and feet. An x-ray of the abdomen revealed calcification of the pancreas. Laboratory studies demonstrated anemia (PCV = 25) hypoalbuminemia and hypocalcemia. A malabsorption work-up was initiated. No vitamin supplements were administered. On the seventh hospital day a physician's note on the chart read "doubt pellagra." On the eighth day a diagnosis of pellagra was made on clinical grounds by a consultant. Blood samples were taken and treatment was started at once. There was dramatic improvement following the daily administration of a multiple vitamin preparation plus 100 mg niacinamide daily. Although blood levels of niacin, riboflavin, folate and vitamin B₁₂ were reported as normal, the laboratory reported subnormal levels of thiamin and ascorbate. In addition to vitamin therapy, he was given supplemental pancreatic extract orally.

Comment—The normal blood niacin level is not unexpected. Chronic pancreatic insufficiency no doubt contributed to the syndrome of malnutrition in this individual. However, it took eight days to make a diagnosis that might have been made in eight minutes. Appropriate therapy was delayed and hospitalization was unnecessarily prolonged.

Case #4

A 24-year-old male who had been an insulin-dependent diabetic since age nine developed nephrotic syndrome, peripheral neuropathy and muscular atrophy. He was discharged from the hospital and remained bedridden at home for approximately two months consuming a poor diet without vitamin supplementation. Daily caloric intake was estimated to be 400 to 500 calories. When next admitted, he had widespread skin lesions, more pronounced on exposed surfaces, and other clinical features compatible with pellagra.

Comment—Although the long-range course may not have been affected, a vitamin supplement and better diet could have improved the patient's sense

of well-being and obviated the need for this hospitalization.

Case #5

A 25-year-old female underwent an ileal by-pass procedure seven months earlier. Subsequently, she developed a chronic illness characterized by nausea, vomiting, diarrhea, intermittent fever, jaundice anorexia, and muscular weakness. Body weight had declined from 160 kg (355 lbs.) to 103.6 kg (230 lbs.). She had received regular injections of vitamin B₁₂, and an oral multi-vitamin preparation that did not contain folate. The thought of food became repugnant to her. Food intake became limited to a few servings of vegetables and essentially no meat. Her tongue became sore and she lost her taste for food.

Laboratory studies revealed anemia, hypoproteinemia, hypocalcemia, and hypomagnesemia. Plasma folate (*L. casei*) was 1.04 ng/ml (normal 2 to 10.1), serum carotene was 24 µg percent (normal > 50) and the serum B₁₂ was 2,084 pg/ml (normal 160 to 900 pg/ml). Serum zinc was 54 µg percent (normal 60 to 148).

She was given total parenteral nutrition for a period of two weeks via a central venous line inserted through the subclavian vein. This provided 100 grams daily of protein (casein hydrolysate) and 2,000 calories as glucose. In addition to the vitamins and minerals given by the I. V. route, she received a solution containing 20 mg of zinc sulfate orally three times daily for one week.

There was a dramatic improvement in her sense of well-being, mood, and strength. There was improvement in most laboratory indices, although liver function and serum bilirubin remained abnormal. She was discharged with a good appetite, weighing 135.1 kg (220 lbs.).

Comment—The management of obesity is difficult at best. A great deal more needs to be learned about the physiology of digestion and nutrient absorption in obese subjects such as the one described. It seems certain, however, that more careful attention to the principles of nutritional equilibrium would have greatly lessened some of the discomfort and complications experienced by this patient.

Admittedly, these are only five examples, chosen for the purpose of calling attention to a serious problem. There are many others. I would like to be able to tell you about renal dialysis

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patients, patients with burns, cancer, diabetes, and the many alcoholics. I assure you that, if space permitted, I could cite a long list of hospitalized patients who have endured similar experiences, simply because basic principles of nutrition were not observed by the attending staff.

These experiences have led us to start an informal review of in-hospital practices, in an effort to gather statistical information and to get a better understanding of the frequency and causes of nutritional problems. Although the results must be considered preliminary, some interesting results are beginning to appear. Dr. Elizabeth Prevost, a post-doctoral fellow in Nutrition in our institution, has recently completed a review of eighty medical and surgical charts, selected only on the basis that the patient had been hospitalized for two weeks or more at the time of chart review. It is our intention to review 100 such charts, but preliminary analysis indicates the following:

1. Body height was not recorded in 56 percent of the cases. Thus, it was impossible to calculate the patients' ideal weight.
2. Body weight was not recorded in 23 percent of the cases.
3. Body weight was not recorded during the first seven days in 26 percent; and was not recorded regularly in 43 percent.
4. Of 36 subjects whose data were suitable for analysis, weight loss occurred in 22 (61 percent) and it averaged 6 kg.
5. Patients were not allowed any food by mouth for an average of 3.1 days. It has not been possible to tally the number of meals they missed altogether.
6. Hypoalbuminemia (< 3.0 gram-percent) was present in 28 percent at admission and developed later in an additional nine, making a total of 37 percent. Orders reflected no apparent therapy (in terms of diet or intravenous feeding) in fifteen of these thirty cases.
7. Excluding patients on the hematology service, anemia was present at admission in 37 percent; another 16 percent of the patients developed anemia while in the hospital. The staff's penchant for taking blood samples from patients is probably a contributing factor.
8. Fourteen patients were hospitalized for more than three weeks, without oral or parenteral vitamin supplement-

tation, although circumstances of their illnesses and prior histories suggested the possibility of nutritional inadequacy.

9. The hospital pharmacy issued 128,000 units of intravenous glucose during the year, mostly liter-size bottles of 5 percent or 10 percent glucose. Assuming that each unit represented a displaced meal, and 18 percent of all projected meals consisted of a bottle of glucose, this figures out to be a nutritional deficit of 2,600 calories for each patient, each week.

10. Virtually all patients received expensive and elaborate diagnostic studies, complex drug programs, or highly specialized surgical management.

We believe this preliminary analysis indicates an urgent need for a nutrition survey on a statistically adequate national sample of hospitalized patients.

It seems abundantly clear that we are not making appropriate use of information that is in our possession for the care of the sick and disabled. This, in my opinion, is inexcusable. In an effort to seek out causes, so that suitable corrective action may be taken, I have drawn up a list of undesirable nutrition practices now taking place in our hospitals. I believe they exist to a greater or lesser extent in most large U.S. hospitals today. The majority of these deficiencies could be corrected by the application of a little common sense and effort. In terms of benefit to health, and in contrast to the vast sums of money being poured into certain areas of health care and research, relatively small investments in nutrition can pay rich dividends.

UNDESIRABLE PRACTICES AFFECTING THE NUTRITIONAL HEALTH OF HOSPITAL PATIENTS

1. Failure to record height and weight.
2. Rotation of staff at frequent intervals.
3. Diffusion of responsibility for patient care.
4. Prolonged use of glucose and saline intravenous feedings.
5. Failure to observe patients' food intake.
6. Withholding meals because of diagnostic tests.
7. Use of tube-feedings in inadequate amounts, of uncertain composition, and under insanitary conditions.
8. Ignorance of the composition of vitamin mixtures and other nutritional products.
9. Failure to recognize increased nutritional needs due to injury or illness.
10. Performance of surgical procedures without first making certain that the patient is optimally nourished, and failure to give the body nutritional support after surgery.
11. Failure to appreciate the role of nutrition in the prevention of and recovery from infection; the unwarranted reliance on antibiotics.
12. Lack of communication and interaction between physician and dietitian. As staff professionals, dietitians should be concerned with the nutritional health of every hospital patient.
13. Delay of nutrition support until the patient is in an advanced state of depletion, which is sometimes irreversible.
14. Limited availability of laboratory tests to assess nutritional status; failure to use those that are available.

I have presented here evidence which suggests that malnutrition is a common accompaniment to the stress of illness among hospitalized patients. It undoubtedly contributes to increased mortality and morbidity. Although when recognized, malnutrition is usually reversible and preventable, it often goes unrecognized. Preliminary experience suggests the need for a nutrition survey on a statistically adequate national sample of hospitalized patients.

Many undesirable practices concerning the nutritional care of hospitalized patients have their roots in long-standing neglect of nutrition in medical education and in health care delivery systems.

Relatively modest revisions of attitude, administrative effort, and financial support could reverse this neglect and pay rich dividends. There is every justification, and an urgent need, for these revisions to be made without delay. Readers of *Nutrition Today* who are affiliated with a hospital are encouraged to look at the nutritional practices in their institutions. They shouldn't be surprised to find a skeleton behind the first door they open.