VITAMIN C NUTRITION IN NORTH-EAST ENGLAND

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In the winter and spring months of 1943 an estimate was made of the vitamin C balance of 100 adults living in a mining town on the north-east coast of England. The findings may be of interest.

Harris (1939) noted that vitamin C subnutrition was increased during the 1914-18 war. Orr (1936) suggested that more than half of the population of Great Britain received less than the reputed optimum allowance of vitamin C. Harris (1940) found subnutrition prevalent among elementary-school children, and in 1942 he noted that nutrition among students and school-children was at a lower level than it had been before the war. Other reports of the nutritional state of various sections of the community have been published, but no recent findings have been noted from this area.

Rationale and Method of Investigation

The reader may be reminded that the minimum daily requirement of vitamin C for the preservation of health is in the region of 25 mg. (Abbasy *et al.*, 1935); that a normal adult on a middle or higher working-class diet excretes between 15 and 30 mg. a day (Harris and Ray, 1935); and that oral administration of a "test dose" of ascorbic acid to an undernourished subject results in its retention in the tissues until the deficiency is made good, while administration of the same dose to one who is well nourished results in the early overflow of a large part of that dose into the urine.

Cases suffering from any clinically recognizable disorder which *per se* could lead to an increased vitamin C demand and metabolism were excluded from the survey. In addition to clinical examination the B.S.R. was estimated in each case. One hundred intelligent and co-operative patients were selected, 38 being males and 62 females. Details of the present and past dietetic habits of each patient were obtained at the outset and correlated with the ultimate findings. No case included in the series developed an intercurrent infection. The ascorbic acid was administered by the "test-dose" method of Harris and Ray, the "test dose" being 700 mg. ascorbic acid per 10 st. (63.5 kg.) body weight. The vitamin C excreted in the urine was preserved by the method of Sendroy and Miller (1939), and estimation of the vitamin C content of the urine was made by titrating against a freshly prepared standardized solution of 2:6 dichlorophenolindophenol.

Findings

(1) *Males*.—Of the 38 cases examined 35 responded briskly to test-dosing, the response coming on the first or second day. Three were sluggish in their response, the rise coming only on the third or fourth day. None showed clinical evidence of vitamin C subnutrition. The three cases with sluggish response were regarded as being unsaturated but not undernourished.

(2) *Females*.—Of the 62 cases 27 responded briskly on the first or second day. The remaining 35 were sluggish in their response and were distributed as follows: third day, 25 cases; fourth day, eight cases; fifth day, two cases. Slow response (and therefore presumably slightly depleted reserves) was found more frequently in those women whose husbands were living away from home than in those whose husbands were at home, the ratio being 5:1; and, conversely, the bulk of the women who responded briskly had their husbands living at home.

The clinical findings in one of the women with slow response were of interest. Her husband was in the Forces, her children had their midday meal at school, and she herself was living on an obviously inadequate diet. The response to test-dosing with ascorbic acid came on the fifth day. She was slightly under weight, and there were two large bruises on the extremities at the time of examination, which she attributed to slight trauma. There was no obvious pyorrhoea, but the gums were spongy and bled easily. Hess's test was positive, and there was a normocytic normochromic anaemia, the red cells numbering 3,200,000 per c.mm. and the Hb (Sahli)

being 65%. Unfortunately, continuous observation in this case was interrupted, but when the patient was seen again several months later the sponginess and bruising tendency had disappeared, Hess's test was negative, and the blood picture had improved, the red cells now numbering 4,200,000 per c.mm. and the Hb being 80%. In the interval she had had a more balanced diet and had taken ascorbic acid 200 mg. daily by mouth. No medicinal iron had been given. Her original state was due to general malnutrition and not to avitaminosis C alone. There is no relation between spongy bleeding gums and vitamin C deficiency unless this is so severe as to produce scurvy; and increased capillary fragility does not appear to be related to vitamin C deficiency. One must conclude that the improvement was due to the better diet and not to the ascorbic acid supplement.

Summary and Conclusions

The results of assessment of the vitamin C balance of 100 adults resident on the north-east coast of England are given. From a study of this comparatively small series one might say that: (1) The men on the whole were well nourished. (2) Many of the women had less satisfactory reserves. (3) Diminished reserves were found more often among those women whose husbands were living away from home than among those whose husbands were at home. (4) As would be expected, the quickest response was seen in those cases which had a satisfactory dietetic history. (5) Diminished intake of vitamin C was due to apathy or ignorance and not to poverty or non-availability of suitable foodstuffs. (6) Close inquiry should be made into the intake in all doubtful cases and advice on suitable diet given. A nutritious diet, with perhaps added ascorbic acid, is necessary in conditions where there is likely to be an increased vitamin C demand—e.g., toxic, infective, and traumatic states.

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Medical Memoranda

Gangrenous Enteric Intussusception in Adolescence

The following case is considered to be worthy of record owing to its rarity. The management of the case also presented interesting features.

CASE HISTORY

The patient, a girl aged 14, was admitted to the Royal Victoria Infirmary, Newcastle-upon-Tyne, on Jan. 16, 1946. She gave a history of vomiting for five days, severe abdominal pain, and almost complete constipation, with the passage of blood per rectum for two days before admission. She was extremely dehydrated, with sub-normal temperature and a pulse rate of 126 per minute. On examination there was generalized abdominal rigidity, with marked central abdominal swelling. She was given three pints (1.7 l.) of intravenous glucose-saline before operation, which was delayed six hours for this purpose.

Through a right longitudinal rectus-splitting incision the abdomen was explored. A greatly distended loop of jejunum was found; this was 40 cm. long, and was delivered through the wound after the incision had been enlarged upwards. The intussusceptum and intussusciens were both seen to be gangrenous, the former being perforated. The intussusception was resected, with end-to-side anastomosis, and the abdomen closed with drainage.

Ten pints (5.68 l.) of glucose-saline were given during the next 24 hours. The blood-urea estimation was 60 mg. per 100 ml. and serum chlorides 298 mg. per 100 ml. These tests were performed on Jan. 17. In the first 24 hours 15 oz. (425 ml.) of urine were passed. On the second post-operative day five pints (2.84 l.) of intravenous glucose-saline were given: urinary output was increased to 42 oz. (1.2 l.). Four days after operation the patient was taking fluids well by mouth, bowel sounds had returned, and flatus had been passed. On Jan. 22 a bile-stained discharge was observed on the dressing. By the next day the trickle had become a flood. Fluids by mouth were severely restricted and intravenous therapy restarted; four pints (2.27 l.) of glucose-saline and one pint (568 ml.) of plasma were given every 24 hours. Continuous suction was applied to the fistula, but some leakage occurred.