

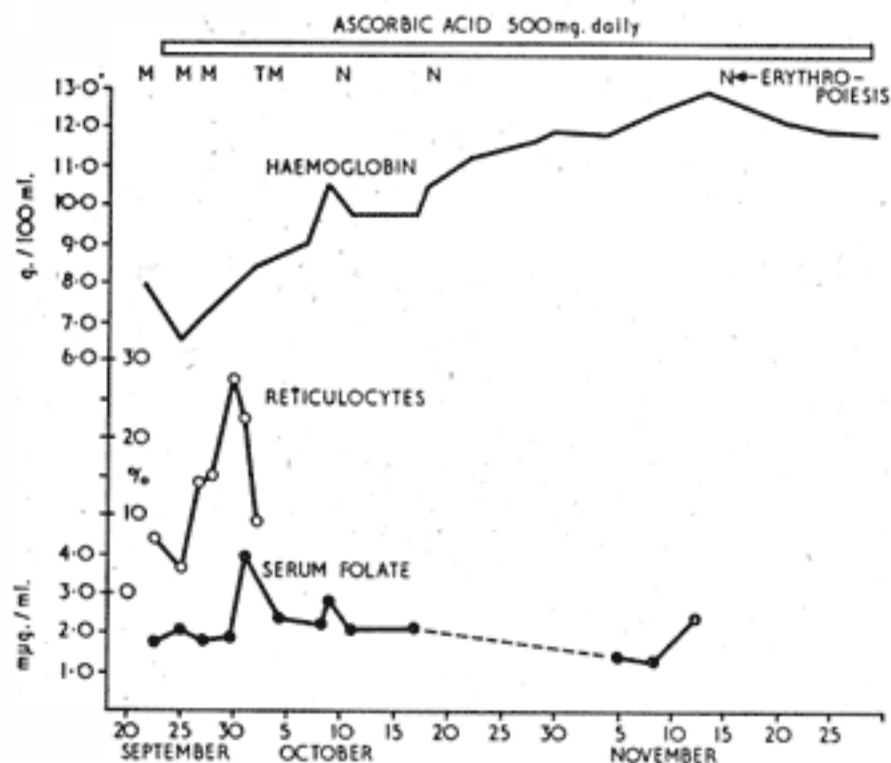
## Scorbutic Megaloblastic Anaemia Responding to Ascorbic Acid Alone

*Brit. med. J.*, 1967, 4, 402

In recent years there has been discussion on whether the megaloblastic anaemia occasionally found in scurvy is due to deficiency of ascorbic acid or of folic acid. The diet taken by a scorbutic patient is usually also inadequate in folic acid. In many cases the apparent response of the megaloblastic anaemia to ascorbic acid may have really been due to the introduction of folic acid in the ward diet (Zalusky and Herbert, 1961). We here report the response of a scorbutic megaloblastic anaemia to ascorbic acid alone, the patient receiving a ward diet deficient in folic acid.

### CASE REPORT

A 70-year-old man was urgently admitted to hospital in September 1963 complaining of painful swollen legs of three weeks' duration, with more recent spontaneous bruising. For four months before admission his general condition had deteriorated and he had lost weight. During this time his diet consisted of tea and toast with an occasional meat stew, and excluded fruit and vegetables. On examina-



Erythropoiesis: M=megaloblastic; TM=transitional megaloblastic; N=normoblastic.

tion the significant findings were pronounced anaemia, extensive bruising of both legs with perifollicular haemorrhages, cork-screw hairs, and hyperkeratosis. Both calves were very tender.

**Investigations.**—Haemoglobin 8.0 g./100 ml. M.C.H.C. 36%, M.C.V. 117 cu.  $\mu$ . Reticulocytes 2%. Marrow: erythropoiesis was frankly megaloblastic and the iron stores were increased. Serum iron 125  $\mu$ g./100 ml.; serum vitamin B<sub>12</sub> 320  $\mu$ g./ml.; serum folate 1.7  $\mu$ g./ml. Ascorbic acid 500 mg. by mouth daily resulted in very little ascorbic acid excretion until the eleventh day.

The patient was maintained for the period of study on a folate-deficient diet composed of tea, bread, jam, egg, fish, chicken, minced meat, and potato. He was given 500 mg. of ascorbic acid daily by mouth. The haematological response is shown in the Chart. A good reticulocyte response was obtained. A series of marrow punctures showed a slow reversion of erythropoiesis to normal by the seventeenth day. The haemoglobin level showed a steady

rise, reaching 12.3 g./100 ml. in seven weeks. Frequent serum folate estimations were carried out, with repeatedly subnormal results except for one low normal figure. There was initially a dramatic improvement on ascorbic therapy, and then a gradual return to his normal state. Later a normal diet and folic acid 15 mg. daily were given.

### DISCUSSION

The patient showed a complete response of megaloblastic erythropoiesis in scurvy to ascorbic acid alone.

Zalusky and Herbert (1961) treated a scorbutic patient on a folate-deficient diet with ascorbic acid and the megaloblastic erythropoiesis became more gross. Additional treatment with 50  $\mu$ g. of folic acid daily intramuscularly caused a reticulocyte response and rapid conversion of erythropoiesis. From this they adduced that the megaloblastosis found in scurvy is due to concomitant folic acid deficiency. In the literature we have found several reports of patients with megaloblastic anaemia and scurvy treated in a similar manner to ours, the diet during treatment with ascorbic acid being either the same as before admission to hospital (Bronte-Stewart, 1953; Goldberg, 1963), or deficient in animal protein and vitamin C (Brown, 1955; Neilson, 1960), or specifically folate deficient (Cox, Meynell, Northam, and Cooke, 1967). We therefore believe that dietary folic acid was not the cause of the response in these patients.

The experimental work of May and his colleagues showed that the megaloblastic erythropoiesis of monkeys fed on a diet deficient in vitamin C and folic acid reverted to normal when either vitamin was given (Sundberg, Schaar, and May, 1952), and that the explanation of this lay in the increased requirement for folic acid of the scorbutic animal (May, Hamilton, and Stewart, 1953). Haemorrhage and haemolysis, both features of scurvy, may lead to folate depletion in man (Rachmilewitz, 1965). The slow reversion of erythropoiesis to normal in our case and in that of Hyams and Ross (1963) favours the indirect nature of the effect of ascorbic acid on folate metabolism. The difference between the cases which have responded to ascorbic acid alone and the case of Zalusky and Herbert may be in the degree of tissue folate deficiency. A more fundamental role for ascorbic acid in folate metabolism has also been postulated (Vilter, 1964; Cox *et al.*, 1967), but this is still speculative.

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P. ASQUITH, M.B., CH.B., M.R.C.P.

M. H. OELBAUM, M.D., B.Sc., M.R.C.P.

D. W. DAWSON, M.R.C.P.ED., M.C.PATH.

Crumpsall Hospital, Manchester 8.

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