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RED CELLS

Department of Pediatrics and Medicine, University of California San Francisco Medical
Center, and Columbia University College of Physicians and Surgeons (J.A.W.).

Polycythemia as a primary disturbance in hematopoiesis is extremely rare in childhood
but has been recognized as of two types. 1. True polycythemia (Vaquez-Osler's disease)
with marked symptomatology, leukocytosis, thrombocytosis, and unfavorable out-look. This
disease is rarely if ever familial and is seldom seen in childhood. 2. Benign familial
polycythemia which occurs in more than one member of effected families, is not accom-
panied by leukocytosis or thrombocytosis, and there are few if any symptoms. The
prognosis is apparently good.

Two families affected with benign familial polycythemia are reported. The chief com-
plaint was a very ruddy, sanguine, complexion. Hemoglobin concentrations of 16.7 to 27.0
Gm. % were found in affected members. Normal platelets, leukocyte, oxygen saturation,
and bilirubin values are reported. Only type A hemoglobin was found in the erythrocytes.
The total erythrocyte mass was measured and found to be strikingly increased.—N. J. S.

From the Clinical Research Unit, Royal Prince Alfred Hospital,

This paper reports the clinical and laboratory findings of a case of autoerythrocyte
sensitization with a circulating fibrinolytic factor. The patient, a woman aged 40 years, had
suffered painful spontaneous bruising from the time of the menarche at the age of 14 years.
Prior to this, and subsequently, she had suffered a number of episodes of severe bleeding.

The initials of abstracters who are not listed in the above masthead refer to those
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usually 2 or 3 days after minor surgery or confinement. At the time of study she had suffered an intracranial hemorrhage.

Autoerythrocyte sensitization and also a circulating fibrinolytic factor were demonstrated. This factor was thought to be associated with her red cells. Infusion of human serum albumin was associated with subjective and objective improvement. Cortisone was of no benefit.—G. C. de G.


A series of selected cases is presented in order to demonstrate the “sensitization state” or even the production of “free antibodies” in clinical conditions where active hemolysis could hardly be suspected and where the hemolytic state is only demonstrated by special laboratory procedures. In these conditions the authors present cases of hepatosplenic schistosomiasis, hepatic cirrhosis, megaloblastic anemia, Waldenström’s macroglobulinemia, reticulomylbhosarcoma and also aplastic anemia. The last, is one of the cases presented, revealed itself as a prolonged aplastic phase of a true acquired hemolytic anemia, with hypercellular and hyperplastic bone marrow substituting for the initial aplastic one. Leukopenia and thrombocytopenia were associated with the hemolytic anemia in this case.

Such cases illustrate the need of searching either the “sensitization state” or “free antibodies” even in hemopoietic disorders where active hemolysis is hardly expected, overall in those cases where the chronic course is associated with anemia, leukopenia and thrombocytopenia.—M. A. J.


Auto-immune hemolytic anemia in a 5-month-old male child (Hb. 5 Gm.) is described. Treatment with ACTH and Prednisone resulted in cure.—J. B. C.


Of all the endocrine anemias, those from pituitary insufficiency appear to be by far the most common and severe.

Red cell depletion is almost constant in postpartum Sheehan’s syndrome and may be so severe as to constitute an alarm symptom, but it is also frequently seen in certain pituitary tumors (chromophobe adenoma, carcinoaphyrynogoma) and in various other types of panhypopituitarism. In all of these cases the anemia is usually microcytic, hypo- or normochromic during the greater part of its course and is accompanied by a medullary hypoplasia and most often by gastric achylia. Correction is obtained only by a hormonal therapy, sometimes a combination of thyroid extract-testosterone-cortisone in small doses proves quite effective; sometimes it is ACTH that affords the most beneficial results amidst all pituitary hormones.

Many experimental works were for the last years devoted to the study of hypophyseoprivic anemias in the rat. Certain authors, such as Crafts, consider the red cell depletion to be but the consequence of a peripheral hormonal deficiency: conversely some others (Evans, Van Duke, Contopoulos and co-workers) think this anemia to be far more pronounced than that obtained by simultaneous ablation of the thyroid, gonads and adrenal glands; a plurisubstitutive peripheral hormonotherapy would afford but little benefit.

Such observations are strongly suggestive of the existence of a specifically hematopoietic pituitary substance.—J. D.
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Peculiar laminated structures 0.1-0.5μ in diameter were observed when phagocytosed red cells were undergoing intracytoplasmic lysis, or in certain altered red cells of Cooley's anemia. The disposition of the contours is reminiscent of finger prints. The laminae vary from 60-80Å and the intervening spaces from 75-120Å. Apparently the bimolecular membranes of lipid chains are separated by osmiophobic hydrophiles and correspond in thickness to the double lipid chains of lecithin-like bodies.—O. P. J.


Synthetic anionic detergents can destroy red cells by two mechanisms which normally operate simultaneously. A rapid process involves action of the detergent on free phospholipid in the cell wall; the component concerned is easily removed from the cell membrane. A slow process is identical with that by which most hemolytic agents act and if it can operate alone it yields percentage hemolysis—time curves that are sigmoid in shape. The process takes place in stages and seems to involve the slow breakdown of a lipoprotein complex on the cell surface. If phospholipid is removed from the cell wall, it is slowly replaced from phospholipid bound as lipoprotein or possibly by synthesis from metabolites in the membrane.—R. H. G.

TREATMENT OF PERNICIOUS ANEMIA

RESPONSE OF MEgaloblastic ANAEMIA TO PREDNISOLONE. A. Doig, R. H. Girwood, J. J. R. Duthie and J. D. E. Knox. From the Department of Medicine, University of Edinburgh and the Rheumatic Unit, Northern General Hospital, Edinburgh, Scotland. Lancet 2:966-972, 1957.

Prednisolone, usually 30 mg. daily by mouth for 20 days, caused a hematologic response in three patients with pernicious anemia, two with megaloblastic anemia in adult life after celiac disease, and one with megaloblastic anemia after partial gastrectomy. The investigations included maximal histamine secretion tests, serum vitamin B₁₂ estimations, measurement of absorption of folic acid and of labeled cyanocobalamin and serum iron measurements before and after treatment. The serum iron did not fall rapidly, as occurs with cyanocobalamin or folic acid treatment. Prednisolone tablets did not contain vitamin B₁₂ or folic acid.

Two patients with rheumatoid arthritis had the clinical, hematologic and biochemical features of pernicious anemia, but had normal absorption of labeled vitamin B₁₂ and gastric juice that improved the absorption of labeled vitamin B₁₂ in pernicious anemia patients. There were no biochemical suggestions of a malabsorptive disease, and no intestinal blind loops.

These patients, too, responded to prednisolone by mouth. Steroids should not be used as a means of treating megaloblastic anemia.—R. H. G.


The capacity of certain bacteria to adsorb free, but not bound, vitamin B₁₂ has been utilized for the assay of vitamin B₁₂-binding power. In an earlier study (1958) the author found that the results of this method tallied well with those of a dialysis method, provided the pH was close to neutral, but not if the pH was off this optimum. In this study the
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adsorption of Co\textsuperscript{60}-labeled B\textsubscript{12} by \textit{L. leishmannii} and \textit{E.coli} under different conditions was investigated. \textit{L. leishmannii} resting cells were found to adsorb about 100 per cent free B\textsubscript{12} at pH 1–7, at higher pH's the uptake decreased. Gastric juice inhibited the uptake of the vitamin at neutral pH. At low pH the bound vitamin was detached from the binding principle and taken up by the \textit{L. leishmannii} resting cells, but not by the \textit{E.coli} strains studied.—M. S.

**Reduced Effect of Heterologous Intrinsic Factor.** M. Schwartz, P. Lous and E. Meulengracht. From Bispebjerg Hospital, Copenhagen, Denmark. Lancet \textbf{1}:751–753, 1957.

Oral administration of vitamin B\textsubscript{12} plus intrinsic factor is sometimes unsuccessful in pernicious anemia. This is an investigation, using Cobalt\textsuperscript{60}-labeled cyanocobalamin to find why this is so. The Schilling method was employed. In untreated pernicious anemia and after injection treatment an increased dose of intrinsic factor gave, up to a certain limit, increased intestinal absorption, but in 15 patients who had been given oral therapy for only a few doses, this was not consistently the case. Human gastric juice added to cyanocobalamin promoted its absorption as well as those showing this blockage as in the others. The cause of the block is not known.—R. H. G.

**Maintenance Therapy in Pernicious Anaemia Controlled by Determining Vitamin B\textsubscript{12} Level in Plasma.** H. P. Kristensen, J. Lund, A. S. Ohlsen and J. Pedersen. From the Biochemical Institute, University of Copenhagen and Frederiksberg Hospital, Copenhagen, Denmark. Lancet \textbf{1}:1266–1270, 1957.

The vitamin B\textsubscript{12} level of the plasma was measured by a \textit{L.leishmannii} method in 12 patients with pernicious anemia before and after treatment with injected cyanocobalamin. Thereafter an oral preparation containing vitamin B\textsubscript{12} and hog pyloric mucosa did not maintain the plasma vitamin B\textsubscript{12} level at a normal figure, and in four out of six cases the marrow showed megaloblasts during this treatment. The daily dose given varied from 10 \textmu g. vitamin B\textsubscript{12} plus intrinsic factor corresponding to 100 mg. hog pyloric mucosa, to four times that amount.—R. H. G.

**Maintenance Therapy in Pernicious Anemia Controlled by Plasma Vitamin B\textsubscript{12} Determinations.** H. P. Østergaard Kristensen, A. Søe Borg Ohlsen, J. Lund and J. Pedersen. From the Biochemical Institute, University of Copenhagen, and the Frederiksberg Hospital, Copenhagen, Denmark. Ugesk. laeger \textbf{119}:893–898, 1957.

The authors have confirmed the finding that a reduced plasma B\textsubscript{12} concentration is usually the first sign of relapse in pernicious anemia, and often develops much before characteristic changes in hemoglobin and red cells may be found. They stress the importance of plasma vitamin B\textsubscript{12} determinations in controlling maintenance therapy in this disease, particularly when oral medication is given. With the preparation Cycoplex, consisting of vitamin B\textsubscript{12} and small amounts of pyloric mucosa from swine, satisfactory plasma levels of the vitamin often could not be maintained in the long run.—M. S.


An apparent elevation of serum vitamin B\textsubscript{12} levels was produced by the injection of folic acid in patients with nutritional macrocytic anemia, especially in those cases where the vitamin B\textsubscript{12} levels were augmented by prior parenteral therapy. A reciprocal relationship was also indicated by a similar rise in serum folic acid levels following parenteral B\textsubscript{12}.—J. B. C.

After intramuscular injection of 35 $\mu$g. of vitamin $B_{12}$, the serum vitamin $B_{12}$ level was maximal at 1 hour and did not reach basic level in 72 hours. After oral dose of 1000 $\mu$g. the serum level was maximal at 6 hours and did not reach basal level in 48 hours.—J. B. C.


A healthy male doctor was given 3 mg. of folic acid by mouth as a solution of the sodium salt. The material was absorbed normally as shown by serum folic acid estimations. Six weeks later he was given four 5 mg. tablets of folic acid by mouth. Forty minutes later he complained of general malaise, aching pain in the lower thoracic region and respiratory difficulty with restricted inspiration. This was followed by pruritus and a generalized erythematous rash. The results of intradermal tests were positive with commercial folic acid, purified folic acid and aminopterin. They were negative with folic acid, anhydroleucovorin, N10-formyltetra-hydropteroylglutamic acid, teropterin and amethopterin. The positive tests became negative with less than 5 $\mu$g. per ml. of test solution.—R. H. G.

VITAMIN $B_{12}$

THE SERUM VITAMIN $B_{12}$ LEVELS AT VARIOUS AGES. A. Killander. From the Department of Microbiology, Institute of Medical Chemistry, University of Uppsala, and the Department of Pediatrics, University Hospital, Uppsala, Sweden. Acta paediat. 46:585–594, 1957.

This paper gives valuable information concerning the serum vitamin $B_{12}$ levels in various age groups. The study comprises 242 haematologically normal subjects, aged 0 to 82 years. The range of the serum vitamin $B_{12}$ values was found to be wide in both sexes at all ages. The serum vitamin $B_{12}$ concentrations of newborn infants were significantly higher than those of their mothers. Lower concentrations were found in pregnant than in nonpregnant women of the same age. The highest vitamin $B_{12}$ levels were encountered in the age group 1 to 19 years. Adult males showed a somewhat higher mean serum vitamin $B_{12}$ concentration than females of the same age.—M. S.


A L. leishmaniias method of $B_{12}$ assay was applied to the serum of 43 healthy persons (mean level 281 $\mu$g./ml.; range 105–672), 90 control hospital patients (mean 244; range 85–625), 20 with pernicious anemia (mean 41; range 5–95), 60 with idiopathic steatorrhea and 43 with regional ileitis. In 22 of 60 cases with idiopathic steatorrhea so investigated the serum vitamin $B_{12}$ levels were below 100 $\mu$g./ml., and in 14 others out of 18, a deficiency was diagnosed from a hematologic response to cyanocobalamin therapy. Of 40 patients with regional ileitis, 23 had low serum $B_{12}$ levels. In enterocolitis and ulcerative colitis normal levels were obtained.—R. H. G.

A 71-year-old man had complete obstruction of the common bile duct by a calculus. He developed acute diffuse liver necrosis and hepatic coma and had a serum vitamin B₁₂ level of 7,040 μg./ml. Biliary drainage was carried out and the serum vitamin B₁₂ level was 1276 μg./ml. a fortnight later and 288 μg./ml. a month after that. Most of the vitamin B₁₂ was bound to the serum.

It is considered that release of excessive amounts of a vitamin B₁₂-binding protein from the damaged liver is the most important factor.—R. H. G.


High serum vitamin B₁₂ levels have previously been reported in acute liver disease and hepatic cirrhosis. Eighteen patients with various malignant tumors extensively involving the liver were investigated. In 16 of these the serum vitamin B₁₂ was raised (640–20,000 μg./ml.). The highest was in a patient with hepatic metastases of gastric carcinoma. Multiple myeloma involving the liver was a cause of a raised serum vitamin B₁₂ level, but 19 control patients with malignant disease not affecting the liver had normal B₁₂ levels.

A Euglena method of assay was employed.—R. H. G.


The respective mean values for free and total B₁₂ were 388 μg. and 2,403 μg. in chronic myeloid leukemia; 191.3 μg. and 734.5 μg. in acute myeloid leukemia; 105.5 μg. and 930 μg. in acute lymphatic leukemia; 96.5 μg. and 970 μg. in chronic lymphatic leukemia and 846 μg. and 2080 μg. in monocytic leukemia.—J. B. C.


Free and total vitamin B₁₂ level in serum was estimated microbiologically with Euglena gracilis var bacillaris as the test organism, in a series of 23 patients consisting of homozygous thalassemia, 15 and hemoglobin E-thalassemia disease, 8. In 3 patients the level was distinctly low, total value being 20, 20, and 60 μg. per ml. respectively.—J. B. C.


Three patients with megaloblastic anemia that responded to cyanocobalamin developed granulocytic leukemia.—R. H. G.

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