As regards treatment, I thought it wiser not to prescribe any iodide mixture, but to allow the neuritis gradually to get better with treatment by massage and galvanism, and the use of light splints to keep up moderate extension of his fingers and wrists. Aeroplane splints for maintaining abduction of the shoulders in order to avoid chronic overstretching of the deltoids are too cumbersome and impracticable, and I thought it best to leave them alone, except for massage, passive movements, and electricity.

It is worthy of note that this patient on no occasion had complained of colic, though severe lead neuritis had been present for several months.

A Case for Comparison

A case I saw twenty-three years ago may be recalled in comparison with the origin of this case. The man had about a year before taken a house with large grounds, and as the water supply was from an indifferent well, he had his house connected with a main water supply by a pipe laid for a distance of a quarter of a mile up the drive to his house. This had been contracted for to be laid in iron pipes. After living there for several months he began to suffer from chronic indigestion, which was diagnosed as being due to duodenal ulcer. Medical treatment did not improve this, and as he was getting worse a surgeon from Manchester decided that an operation was necessary for the duodenal ulcer, and this was arranged to be done on a certain day, and the operation would have been performed had not his butler on the day previous to that arranged for the operation developed bilateral wrist-drop. Although the butler had not suffered from colic, the wrist-drop was recognized as being due to lead neuritis, and this led to a revision of the diagnosis of duodenal ulcer in his master, and the operation was postponed. Investigation of the water supply proved that the piping which had been laid down consisted of lead piping and not of iron pipes, as had been contracted for. My patient was removed to a nursing home in another district, and he soon lost his abdominal pain, which was clearly due to lead colic and not to duodenal ulcer. He was therefore saved from operation by the illness of his butler, whose dropped wrists due to lead poisoning were incidentally an excellent testimonial to his character as a water drinker.

E. Gundersen, in a supplement to *Norsk Mag. f. Laegevid.* for December, 1934, records an epidemiological study of mumps during a hundred years in Norway (1834-1934). The disease never wholly died out, and it swept over large areas of the country in great epidemic waves, which recurred at remarkably regular intervals of eight to ten years. Of late there has been a tendency for these intervals to be shorter. They almost invariably began in the autumn, and reached their peak in January and February. From then onwards there would be a decline till the epidemic ebbed out in mid-summer. The ages of the patients were from 4 or 5 to over 30 years, and as long ago as 1852 it was remarked that children under 4 years were immune. Among the notified cases (and they constituted a minority) there was one death for every 2,900 notifications—a total of fifty-three deaths since 1867. They were due to such complications as suppuration of the parotid with septicaemia, brain disease, oedema of the larynx, and nephritis. Considerable variation was observed in the character of the different epidemics, some being very mild, and the patients being for the most part children. Other epidemics would show a preference for adults, who reacted with high fever and were prone to develop metastases. In some epidemics the skin would be often involved, in others the nervous system, the mucous membranes, the digestive or the urino-genital tract. Epidemic parotitis must therefore be considered as remarkably polymorphous in its extraparotid manifestations.

ACHRESTHIC ANAEMIA*

BY

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Summary of Cases

Symptoms referable to the anaemia, such as dyspnoea, palpitation, and undue fatigue were severe in five cases, less prominent in two of them; pyrexia was not a feature. Digestive disorders were usually absent and the bowels were unaffected (except for occasional diarrhoea in Case I). Glossitis was absent. Icterus was present in some degree, but was not severe. Two patients lost weight. Involvement of the central nervous system was not found in any of the cases. Only one patient (Case II) had retinal haemorrhages. The liver was somewhat enlarged in two cases and the spleen was palpable in one. The teeth and upper digestive tract showed no peculiar involvement. The circulatory system presented no unusual features of importance.

The Wassermann reaction was negative in all cases, while the van den Bergh was negative in three, "indirect positive" in two, and gave a direct delayed response in one. Fractional gastric analysis established the presence of free hydrochloric acid in all cases, the quantities varying from hypochlorhydria to hyperchlorhydria, but large amounts of acid were secreted under the influence of histamine.

There was a megalocytic anaemia in every case; the mean diameter of the red cells varied from 7.78 to 8.43 microns, megalocytosis from 12.6 to 46.7 per cent., and the coefficient of variability from 9 to 17.7 per cent. The anaemia when first seen was severe (that is, less than two million red cells) in four cases; there were between two and three million red cells in the other three cases. All the patients except one (Case V) showed severe anaemia at some time. Nucleated red cells—between 4 and 16 cells per 400 leucocytes—were present in five cases. Anisocytosis and poikilocytosis were observed in all cases and varied according to the severity of the anaemia. Polychromasia was usually seen and occasionally punctate basophilia. Reticulocytes, except after intensive parenteral liver therapy, were low, varying from 0.3 to 8 per cent.; Case II showed a maximum of 14 per cent. when the anaemia was severe. The fragility of the red cells was normal in all cases where it was examined.

RESPONSE TO ANTI-PERNICIOUS-ANAEMIA THERAPY

Parenteral liver treatment was given in six cases, but there was no satisfactory response in four of these. Case I in the early stages of the condition responded to large doses of liver with reticulocyte peaks; but later this treatment had no effect. In Case III there was a small rise in reticulocytes (maximum 12.5 per cent.) after intensive treatment, but there was no subsequent response or rise in the red cell count.

Desiccated stomach was given in all cases, and a moderate blood level was maintained for a time at least. Severe relapses, in spite of treatment, occurred in four

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cases; the others remain more or less stationary. Marmite was given to five patients without producing any significant change. Repeated blood transfusions were required in five cases, and four patients were thereby tided over critical periods.

Definition of Achresthic Anaemia

The condition can be defined as a rare but severe hyperchromic, megalocytic anaemia due to lack of utilization, or mobilization from the storage depots in the body, of the anti- (pernicious) anaemia principle as found in liver. It is characterized also by a normal or almost normal gastric acidity, no disturbances of the gastro-intestinal tract or central nervous system, no pyrexia or evidence of haemolysis, and a lack of, or poor response to, anti-anaemic treatment.

Apparently the sexes are about equally affected. The age of onset is much more variable than in pernicious anaemia; the disease may occur between early adult life and old age, whereas the majority of cases of pernicious anaemia are first diagnosed over the age of 40.

Course and Prognosis

The course of achresthic anaemia is chronic with an insidious onset. It seems ultimately to prove fatal, although life appears to be prolonged at least for a time by intensive anti-anaemic treatment and repeated blood transfusions. Prognosis, therefore, must be guarded.

Case I shows that although the patient was rescued from serious relapses by successful transfusions, the end-result was fatal. How far this will apply to the other patients remains to be seen. Those in Cases II, V, and VII maintain a fair condition at the time of writing, while those in Cases III, IV, and VI are in a precarious condition. On the whole it seems likely that the course of these cases may be prolonged, but capacity for work is seriously impaired. A constant watch must be kept for the onset of relapses; blood counts, therefore, should be taken at least every fortnight.

Differential Diagnosis

The association of megalocytic or pernicious anaemia with a large number of different conditions^{15 16} has already been mentioned, and there should be no difficulty in excluding these. However, the following require further consideration.

PERNICIOUS ANAEMIA

This is readily distinguished from achresthic anaemia by: (1) the presence of free hydrochloric acid in the gastric secretion; and (2) the failure of, or poor response to, specific anti-anaemic treatment with an active parenteral liver preparation; the characteristic spontaneous remissions of pernicious anaemia are not seen.

ACHOLURIC JAUNDICE

The familial form with enlarged spleen, increased fragility of red blood cells, jaundice, and, in some cases, persistent reticulocytosis, presents no difficulties. The acquired type as described is a vague condition in which anaemia, splenomegaly, and icterus of fairly sudden onset occur in adults; increased erythrocyte fragility may not be prominent. Dawson³ doubts the existence of this type, and Vaughan⁹ regards all cases as being due to an inborn abnormality of the erythrocytes, which may, at any time during life, either chronically or acutely, lead to the syndrome of acholuric jaundice. She points out that extensive investigation is required before a case can be regarded as non-familial. This description certainly fits

the facts better than the conception of a separate acquired type. Witts¹⁹ has stated that blood transfusion in such cases is often followed by a severe haemolytic crisis; this differentiates them from cases of achresthic anaemia, but clearly the diagnosis must be made before the transfusion is given. Consequently, even slight increases of red cell fragility together with other signs should engender caution when giving transfusions.

ACUTE HAEMOLYTIC ANAEMIA OF LEDERER

This is easily differentiated by signs of acute haemolysis, persistent high reticulocytosis, pyrexia, occasional purpuric eruptions, and leucocytosis with large numbers of immature white cells and nucleated red cells.

HODGKIN'S DISEASE

Hurst,⁶ Davidson,² Goodhart,⁴ and Weber and Schwarz¹⁰ have described cases of megalocytic anaemia which have proved to be due to Hodgkin's disease. In the absence of enlarged glands, which might provide a diagnosis by biopsy, or other evidence of enlarged glandular masses, Hodgkin's disease cannot certainly be held responsible.

APLASTIC ANAEMIA

The clinical features at the onset of aplastic anaemia may closely resemble achresthic anaemia, but there is very little evidence of blood regeneration—that is, reticulocytosis and nucleated red cells are usually absent. The course of aplastic anaemia is more rapid and it goes steadily downhill. There is, of course, complete aplasia of the haemopoietic tissues at necropsy.

"HAEMOLYTIC" ANAEMIA OF PREGNANCY

This condition is always associated with pregnancy or the puerperium, and it responds to adequate doses of the anti-anaemic liver principle with complete recovery. Treatment may be discontinued when the blood is normal, and further relapses are not seen as a rule. There is usually a normal gastric acidity.¹³

LIVER DISEASE

The occurrence of megalocytic anaemia associated with disorders of the liver has received attention from several writers, notably Wintrobe and Shumacker.¹⁸ Disease of the liver must be excluded when considering a diagnosis of achresthic anaemia, but in practice little difficulty arises. In the cases reported by Wintrobe and Shumacker the patients were clearly ill of liver disease, and the anaemia was "slight or moderate when compared with the gravity of the patient's illness." In the two cases of achresthic anaemia with enlarged livers in the present series, the anaemia was the prominent condition, and there were no clinical signs or symptoms of liver disease.

Again, spontaneous remissions were a feature of the liver disorder cases, and they often "took place in face of clinical aggravation." This is not seen in achresthic anaemia. Fractional gastric analysis has shown both achlorhydria and free acid. Wintrobe and Shumacker obtained a response to liver therapy in only one out of four cases. Neither of these points is helpful in diagnosis.

CARCINOMA OF GASTRO-INTESTINAL TRACT

Malignancy of stomach and colon should always be looked for clinically, and will be found radiologically if the blood has reached the stage of megalocytosis. Gastric analysis may yield evidence of carcinoma even though hydrochloric acid may be present. The characteristic reticulocyte response usually follows parenteral liver therapy (Wilkinson^{15 16}).

Treatment

It will be appreciated from what has already been said that treatment is not very satisfactory. Parenteral liver therapy should be given a trial in the first place, since it may also furnish important diagnostic information from the responses obtained. Much larger doses than are usually given in pernicious anaemia will be found to be necessary; as much as 6 to 8 c.cm. of liver extracts intramuscularly daily should be given for from seven to fourteen days—preferably divided into several doses throughout the day. If no reticulocytosis occurs, or if there is but a moderate response with a poor improvement in the red cell count, then blood transfusions must be considered. These must be repeated until a reasonable red blood cell count is reached. No untoward reactions have occurred in the cases described in this series. Maintenance treatment must be vigorous always, and should consist of regular injections of parenteral liver extracts (4 to 8 c.cm. weekly, or even more frequently) with desiccated stomach (such as pepsac or gastrexo) in doses of 1 oz. daily, while marmite may also be given. When the relapses occur blood transfusions must be repeated as often as is necessary. Splenectomy is not indicated, and, indeed, would not appear to be advisable.

Aetiology

It is known that a megalocytic anaemia of the Addisonian type may follow interference at different stages with the normal elaboration and storage of the anti-anaemic factor. Thus, absence of haemopoietin (the intrinsic factor) or of certain food elements (the extrinsic factor), or the prevention of their interaction in the stomach (as may occur after gastro-enterostomy), means the non-production of the so-called anti-anaemic liver principle (or a precursor of it) and the development of pernicious anaemia. Lack of absorption of this formed principle from the alimentary tract will, of course, allow of the production of a similar anaemia.

Even assuming a normal absorption and storage of this anti-anaemic principle it is possible that in certain circumstances it may remain unavailable for haemopoiesis. This possibility arises in the case of achresthic anaemia, and it is therefore important to decide whether this anaemia is really due to some such disturbance of erythrocyte maturation and not to excessive blood destruction.

It may be stated at the outset that such possible causes of anaemia as exposure to haemolytic poisons, and the presence of known toxæmias or of other diseases, have been excluded, and that with present knowledge the anaemia appears essentially to be primary in character. Witts²⁰ has pointed out that no really reliable criteria exist for making this decision at present. Nevertheless, careful consideration of all the facts does give an indication as to the more probable alternative. Taking first the question of excessive blood destruction, it will have been noted that some of the cases in the present series showed some hyperbilirubinaemia, while the morbid anatomy of Case I indicated a marked haemosiderosis, although no excess of urobilin was observed in the urine. Such criteria have been accepted as indicative of destruction of red cells.

But, as Janet Vaughan⁹ has emphasized, it was on these criteria that Addisonian pernicious anaemia was adjudged to be of haemolytic origin, whereas this disease is now known to be due mainly to deficient erythrocyte maturation. In his Goulstonian Lecture Witts²⁰ discussed this seeming contradiction. He pointed out that although these signs undoubtedly accompanied the sudden destruction of a large number of red cells, it was "a serious error to argue in the reverse direction and to conclude that hyperbilirubinaemia and haemosiderosis are always the result of blood destruction." In pernicious anaemia these conditions occur "not because blood breakdown is

accelerated, but because the bone marrow is unable to use these metabolites in the manufacture of fresh red cells." These findings, therefore, are of little assistance.

Evidence as to the rate of delivery of the red cells is, however, more useful. It will be recalled that when the bone marrow is hyperplastic, nucleated red cells may enter the circulating blood, but it is only when an increased reticulocytosis occurs in addition that increased blood formation can be deduced. The cases reported here, except as a result of intensive liver therapy, showed no striking reticulocytosis. It may therefore be concluded that accelerated delivery of red cells, such as would be expected if constant blood destruction were taking place, and especially in view of the marrow hyperplasia, was not present to any marked degree. The balance of evidence, therefore, is against blood destruction as the primary cause of the anaemia under discussion.

In examining the second alternative—defective erythrocyte maturation—the following points must be considered: (1) there is apparently no disturbance of gastric function in these cases of achresthic anaemia; (2) there is positive evidence (from Case I) that the anti-anaemic principle had reached the liver and was present in quantities more than adequate to produce a reticulocyte crisis in a patient with true Addisonian pernicious anaemia; (3) there was a megaloblastic hyperplasia of the bone marrow, and there was indirect evidence of hyperplasia in the presence of nucleated red cells.

Now if we accept the view that the maturation of the megaloblast is brought about by means of a principle which, elaborated in the stomach and stored in the liver and elsewhere, is carried in the circulation to the haemopoietic tissues, it may be inferred that, since the anti-anaemic principle is present in the body, and futile megaloblastic hyperplasia has yet occurred, there has been some interference with the proper interaction between the megaloblast and the anti-anaemic principle. It is tentatively suggested, therefore, that in achresthic anaemia the haemopoietic tissues are unable properly to utilize the anti-pernicious-anaemia principle that is present in the storage depots of the body. Whether this occurs as the result of a failure to mobilize the anti-anaemic factor from the tissues in which it is stored, or whether it is due to the deficiency of still another factor at present undiscovered, or whether the utilization of the anti-anaemic principle is prevented by the presence of some inhibiting agent, remains to be determined.

The achresthic anaemia described here is of a megalocytic type. This suggests that an achresthic anaemia of microcytic type may occur, but for the present it is proposed to limit the term to the group of megalocytic cases described in this paper.

Previous Cases Reported in Literature

Cases presenting the unusual features described have been reported from time to time in the literature. Retrospective diagnosis is at all times hazardous, and here it is made more difficult because many of the earlier cases of anomalous anaemias were inadequately reported.

Holmes⁵ in 1929 described three cases of failure to respond to liver therapy. The patients in the second and third cases died, and at the post-mortem examination megaloblastic bone marrow was found in the femur. No details were given of the state of the gastric secretion, and, of course, no parenteral liver was available. It is difficult to be sure of the nature of these cases. Kennedy⁷ described fully a case of hyperchromic anaemia with free hydrochloric acid in the gastric juice which failed to respond to liver by mouth or to desiccated stomach treatment. The patient showed a remission, which Kennedy thought was spontaneous and not due to the multiple

vitamin therapy that was tried. This remission was followed by a decline, which ended in death. Marked hyperplasia of the bone marrow was found. This description corresponds very well with the cases in our series, and in spite of the fact that parenteral liver was not used the case might very probably have been one of achrestic anaemia.

Of the cases described by Davidson² two (Nos. 5 and 8) might have been of the type under discussion. Both had a megalocytic anaemia with free hydrochloric acid in the gastric juice; both showed resistance to anti-anaemic therapy; and both showed remission and relapse. Post-mortem details were not available. De Crespigny,¹ in reporting some cases of rare anaemias, describes one as "anaemia of aplastic type" which presents features similar to the cases of this series. There was a severe megalocytic anaemia with free hydrochloric acid in the gastric juice, and reticulocytes varying from 9.5 to 17 per cent. It is not really clear that the case was resistant to liver, and no post-mortem details are given.

Thompson, Richter, and Edsall,⁸ in a valuable paper calling attention to the miscellaneous conditions that have been labelled aplastic anaemia, describe a series of cases among which one (No. 2) showed a severe anaemia that refused to yield to all forms of anti-anaemic treatment. At the post-mortem examination hyperplasia of the marrow was found. Details available, however, are not sufficient to make sure of the diagnosis.

Of these seven reports from the literature only the case described by Kennedy presents any really adequate evidence for a retrospective diagnosis of achrestic anaemia; the others are suggestive in varying degree.

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REFERENCES

- ¹ De Crespigny, C. I. C.: *Med. Journ. of Australia*, 1933, ii, 439.
- ² Davidson, L. S. P.: *Quart. Journ. Med.*, 1932, N.S., iv, 543.
- ³ Dawson, Lord: *British Medical Journal*, 1931, i, 921 and 964.
- ⁴ Goodhart, G.: *Proc. Roy. Soc. Med.*, 1932, xxv, 1713.
- ⁵ Holmes, A. H.: *British Medical Journal*, 1929, ii, 952.
- ⁶ Hurst, A. F., and Bell, J. R.: *Brain*, 1922, xlv, 266.
- ⁷ Kennedy, A. M.: *British Medical Journal*, 1931, ii, 5.
- ⁸ Thompson, W. P., Richter, M. N., and Edsall, K. S.: *Amer. Journ. Med. Sci.*, 1934, clxxxvii, 77.
- ⁹ Vaughan, Janet: *The Anaemias*, Oxford, 1934.
- ¹⁰ Weber, F. P., and Schwarz, E.: *Lancet*, 1934, i, 680.
- ¹¹ Wilkinson, J. F.: *Proc. Roy. Soc. Med.*, 1933, xxvi, 632.
- ¹² Idem: *British Medical Journal*, 1932, i, 325.
- ¹³ Idem: *Journ. Obstet. and Gynaecol. British Empire*, 1932, xxxix, 292.
- ¹⁴ Idem: *Quart. Journ. Med.*, 1932, N.S., i, 361.
- ¹⁵ Idem: *Ibid.*, 1933, N.S., ii, 281.
- ¹⁶ Idem: *Acta Med. Scand.*, 1933, lxxx, 466.
- ¹⁷ Wilkinson, J. F., and Klein, L.: *Quart. Journ. Med.*, 1934, N.S., iii, 341.
- ¹⁸ Wintrobe, M. M., and Shumacker, H. J., jun.: *Bull. Johns Hopkins Hosp.*, 1933, lii, 387.
- ¹⁹ Witts, J. L.: *Proc. Roy. Soc. Med.*, 1932, xxv, 1706.
- ²⁰ Idem: *Lancet*, 1932, i, 495.
- ²¹ Discussion on Megalocytic Anaemias of Tropical and Non-tropical Countries, *Proc. Roy. Soc. Med.*, 1932, xxv, 1703.

J. S. Anderson (*Arch. Dis. Child.*, December, 1934) illustrates the mild character of scarlet fever at the present time by the fact that of 1,743 cases admitted to the Leeds City Hospital in 1933 only one showed the malignant type, while twenty-three were examples of the septic type. The relapse rates for this hospital during the years 1931, 1932, and 1933 were 3.6, 4, and 4.3 per cent. respectively. Anderson attributes this relatively high relapse rate to the present benign type of scarlet fever providing insufficient stimulus for the development of immunity. Since October, 1933, he has Dick-tested every patient who is not given scarlatinal antitoxin on admission, and in the case of positive reaction gives a course of graduated skin doses of toxin (500, 2,000, 5,000, and 20,000 skin doses at four-day intervals). The injections were well tolerated, and did not have the slightest adverse effect upon the disease. The result was that of 246 patients who were given toxin only one had a relapse.

SOME EXPERIENCES WITH SPINAL ANAESTHESIA

BY

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The following remarks apply to some 500 cases in which spinal anaesthesia was used for all kinds of operations in lesions below the diaphragm—mostly in the upper abdomen and chiefly on the gall-bladder and bile ducts. In order to keep the conditions as uniform as possible I have used the same anaesthetic and given all the injections myself. The anaesthetic employed was durocaine light solution (specific gravity 1002). It was put up in phials of 3 c.cm., each cubic centimetre containing planocaine 0.1 gram, gliadin 0.00325 gram, in 15 per cent. ethyl alcohol. Recently the supply ran out and could not be replenished; however, Messrs. May and Baker were able to make a substitute (M & B 116) of the same specific gravity, which seems to act practically as durocaine.

Technique

Whether any one reagent has a decided advantage over any other I do not know, but I am sure it is wise to become as fully acquainted as possible with one and develop a uniform technique with it. In this way a confidence is acquired which otherwise would be uncertain.

The procedure adopted in practically all my adult patients has been as follows. Nembutal, 4½ grains, is given by the mouth three and a half hours before operation, and a further 3 grains half an hour before operation, with morphine 1/4 grain, atropine 1/100 grain, and ephedrine 3/4 grain. Other basal anaesthetics have been tried, but discarded in favour of the above. On arrival in the theatre the patient is nearly always asleep, but stirs when pricked, though there is no memory of this. With the patient on his left side and the back fully flexed a drop or two of novocain is injected into the skin in the middle line of the space between the third and fourth lumbar vertebrae, and a spinal needle of the Barker type is inserted here into the theca. A little fluid is run off, 2 c.cm. collected into the syringe which already contains the 3 c.cm. of anaesthetic solution, and then returned moderately quickly into the theca. The rate at which the injection is made is kept as constant as possible. If the pressure of the cerebro-spinal fluid seems higher than usual rather more is run off before injecting. The speed of injection is, I feel sure, one of the factors concerned in the distance to which the anaesthetic reaches, and it is very important, therefore, that this part of the technique should be performed by the same person each time.

Immediately the injection has been made the patient is turned on his back and the table raised to bring him into an upright sitting posture, in which he is kept until there is no response to pinching of the skin with a sharp-toothed forceps just below the umbilical level. At this stage the patient is promptly lowered into a moderate Trendelenburg position, the degree being such that shoulder supports are just necessary to prevent him sliding towards the head end of the table. It usually takes about three minutes, or just under, for anaesthesia to reach the level indicated, and a few minutes later it is found that the upper limit has risen to half-way between the nipple and the clavicles.

Controlled Height of Anaesthesia

During this stage of the procedure two points are clearly established. First, if bleeding occurs through the spinal needle and persists so that blood-stained fluid is drawn into the syringe, there is no certainty as to the efficacy