purgatives and lacto-vegetarian diet were the basis of treatment in the past, when a mucous plug in the ampulla of Vater and catarrhal inflammation of the bile ducts were thought to be the cause of jaundice. Duodenal intubation and lavage with magnesium sulphate solution were tried for the same reason. After animal experiments deficiency of proteins and vitamins was blamed, patients were put on high protein diet and massive doses of methionine, cystine, and vitamin B complex. Miraculous cures were claimed for protein hydrolysates and plasma transfusion. Equally miraculous cures have resulted from transfusion of glucose-saline. Rapid improvement has also been reported due to direct irrigation of the biliary tract with saline during laparotomy. When good results are claimed for such widely different treatments none of these can be specific. The assessment of the value of any form of treatment is exceedingly difficult owing to the natural tendency of the disease towards spontaneous cure. It is only when large numbers of patients have been treated that inefficacy of certain methods can be proved.

The liver has a marvellous capacity for recovery and regeneration. In the acute stage, when the liver cells are inflamed, rest to the organ is indicated more than anything else. Glucose, liberal fluids, and mild laxatives are beneficial. The diet should be light, low in fat, but otherwise balanced. The patient can leave the bed soon after the urine becomes bile-free.

In venereal disease treatment centres extreme care is essential for the prevention of post-arsenical hepatitis. Besides care in sterilizing syringes and needles, each patient receiving injections should be carefully examined before injection. Malaise, nausea, urobilinogen in urine, a trace of bile, or dark urine are all contraindications to arsenical treatment. If arsenic is given after the urine has turned dark, acute necrosis is likely to result. In relapse cases arsenic should be given up for good.

Once cirrhosis is established there is nothing at our disposal to prevent its progress. All that can be done is to prevent the surviving hepatic cells from degeneration. Restricted activities, well-balanced but low-fat diet, and glucose are helpful. All hepatotoxins should be scrupulously avoided. Ascites should be tapped if there is considerable fluid. Anaemia should be treated with iron and liver extracts. If bleeding occurs vitamin K should be injected. All measures to improve general health should be taken.

Morphine is not advisable even in small doses in cholaemia of acute necrosis and late stages of cirrhosis. Even $\frac{1}{4}$ gr. (8 mg.) of morphine is likely to cause fatal coma in a severe case. If delirium is present and insomnia is troublesome, 4 dr. (15 g.) of paraldehyde should be given in saline by rectum and repeated as necessary.

Summary

The course of infective hepatitis and its sequelae are described. Post-arsenical hepatitis is discussed. The development of portal cirrhosis is traced from its source—hepatitis sine icterus. The association of infective hepatitis, subacute necrosis, and portal cirrhosis in areas where infective hepatitis is prevalent is not a chance coincidence. A clinico-pathological classification indicating the course and sequelae of infective hepatitis is given. The mechanism of the production of centrilobular necrosis is discussed. The difference between Laennec's cirrhosis and experimental cirrhosis is stressed. The external appearance of the liver in different stages is described. The unreliability of liver-function tests in estimating the severity of infective hepatitis is demonstrated. Treatment is critically surveyed. Photomicrographs to illustrate the picture of the liver in different stages of the disease are given.

I wish to record my indebtedness to Professor S. J. Hartfall for his constant interest and encouragement. I am indebted to Colonel E. Underwood and Colonel D. Murray for permitting this work to be carried out. My thanks are due to Lieutenant-Colonel R. Kempthorne, Captain Krishnaswamy, Captain Bernstock, and Captain Dexter for valuable help. My thanks are also due to Mr. Dodds for the photomicrographs and to Privates Harry Castle and K. A. Pallister for help in procuring records and other material.

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TREATMENT OF ABORTUS FEVER WITH SULPHONAMIDES AND BLOOD TRANSFUSION

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Since the annotation in the *British Medical Journal* (1947, 2, 700) on the treatment of undulant fever by sulphonamides and blood transfusion two cases have been seen in which this new suggestion could be tried. (These are reported because of the satisfactory response to treatment and because of an interesting complication.)

Case 1

The patient, a youth aged 16, was in perfect health until the beginning of June, 1948, when he began to feel cold and had three attacks of shivering. A week before admission he developed gingivitis. On June 16 he woke up to find that he was blind in the left eye. He had had no pain and did not feel ill. Two days later he was admitted to hospital. His previous history and that of his family were not relevant. He was a farm labourer, spending most of his time with cattle. His employer had also been ill "with something similar," and it was subsequently confirmed that he too had had undulant fever. Bowels and micturition were normal. There was no loss of appetite or weight.

On admission his temperature was 103° F. (39.4° C.), pulse rate 112, and respiratory rate 28. He was flushed and was sweating profusely; nevertheless, he was emphatic that he did not feel ill. Gingivitis was present. His tongue and throat were normal. Blood pressure was 130/70. The cardiovascular, respiratory, and central nervous systems were normal. There was no enlargement of the spleen or liver, but slight enlargement of the cervical, axillary, and inguinal lymph nodes. There were a few macules on the arms and calves. Hess's test was negative. Vision in the right eye was normal except for a refractive error (hypermetropia); the pupil acted on accommodation and to direct light, but the consensual light reflex was absent. The left pupil was larger than the right, and it reacted neither on accommodation nor to direct light, although the consensual light reflex was present. The left eye had an internal strabismus (congenital) and was amblyopic. Ophthalmoscopy showed a recent thrombosis of the central retinal vein, and it was fortunate that it was in the amblyopic eye.

Abortus fever was considered a likely diagnosis for two reasons: the history of working with cattle, and the little discomfort associated with the marked pyrexia and sweating.

Investigations.—A blood count on June 18 showed: haemoglobin, 87% (13.5 g.); colour index, 0.89; red cells, 4,920,000; white cells, 6,000 (neutrophils 3,600—band forms 720, segmented forms 2,880—lymphocytes 2,280, monocytes 120). An agglutination test on June 18 gave a positive reaction to both *Brucella abortus* and *Br. melitensis* in all dilutions from 1 in 20 to 1 in 5,120. Lumbar puncture on June 19 showed: pressure, 60 mm.; no block; approximately 5.5 ml. of clear colourless fluid; 1 cell per c.mm.; red cells, very scanty—cytology, lymphocytes only seen; protein, 18 mg. per 100 ml.; pandy, no increase; Lange, 100,000; Wassermann, negative; chlorides, 700 mg. per 100 ml. A blood culture on June 19, when the temperature was 103.6° F. (39.8° C.), gave a growth of an organism which was morphologically similar to *Br. abortus* and *Br. melitensis*. However, it refused to grow under aerobic conditions, but did so readily with an increased CO₂ tension. This indicated *Br. abortus*. Radiographs of the chest and skull on June 19 were normal. The urine was normal.

Treatment and Progress.—On June 24 he was given 1 pint (570 ml.) of fresh blood and 3 g. of sulphamezathine followed by 2 g. six-hourly. This was continued until July 1—total, 59 g. The pyrexia continued as shown on Chart 1, settling on a lower plane on July 3. A painful small effusion of the left knee developed on June 26 which disappeared four days later. Throughout, he said he never felt ill. The spleen was never palpable. He was discharged afebrile on July 17 after four weeks in hospital, or six weeks since the onset of the illness.

Chart of Case 1

in perfect health. In December he was reported to be still well. The left eye has remained blind.

A differential white count on July 2, after sulphonamide, showed: white cells, 4,100 (neutrophils 1,681—band forms 246, segmented forms 1,435—eosinophils 123, lymphocytes 2,091, monocytes 205).

Case 2

A married woman aged 46 was admitted on Jan. 17, 1949, the diagnosis of abortus fever having been made two weeks previously, the agglutination reaction being positive. She complained of pyrexia in the afternoons and evenings, with much sweating—sufficient to cause her to rise and change her night attire. Her previous history was as follows:

In October, 1948 (12 weeks before admission), she had "influenza." Her symptoms were identical with those described above, and she stated she had not felt well since, sweating having occurred on and off. This was evidently the onset. In December (six weeks before admission) the symptoms became worse, occipital headaches and ulcers in the mouth occurring for the first time. She had had a slight macular rash on the body the week before admission. No joint pains occurred. Her previous history and that of her family were not relevant.

Chart of Case 2

She had lost weight (no details available). The undulant nature of the fever is well shown in Chart 2, kept by her daughter. Both she and her husband worked in a Milk Marketing Board office, but handled only milk return forms. They lived in the

country, the milk supply being direct from a farm and not pasteurized. There was no known contact. On examination her general condition was good, with no obvious loss of weight. She was sweating. The temperature was 99° F. (37.2° C.), the pulse rate 100. All systems were normal. The spleen was not palpable and there was no rash.

Investigations.—An agglutination test on Jan. 1 gave a positive reaction in a dilution of 1 in 1,280 to *Br. abortus*. A blood count on Jan. 18 (before transfusion) showed haemoglobin, 93% (14.5 g.); colour index, 0.95; red cells, 4,920,000; white cells, 4,000 (neutrophils 2,320—band forms 1,240, young forms 40, segmented forms 1,040, eosinophils 80, lymphocytes 1,160, monocytes 440). A blood count on Jan. 27 (after transfusion) showed: haemoglobin 90% (14 g.); colour index, 1; red cells, 4,510,000; white cells, 5,000 (neutrophils 2,000—band forms 650, segmented forms 1,350—eosinophils 500, lymphocytes, 2,000, monocytes 500). A blood culture on Jan. 17 gave a good growth of *Br. abortus* after seven days' incubation. A fractional test meal showed a low acid curve. This was done as it is remarkable that a milk-borne disease should be only sporadic, and it may be that individual susceptibility depends on failure of this first line of defence. The urine was normal.

Treatment and Progress.—On Jan. 19 she was given a blood transfusion of 1 pint (570 ml.) of fresh blood and 3 g. of sulphamezathine followed by 2 g. six-hourly until Jan. 24—total 47 g.

On Jan. 27, the day she left hospital and eight days after starting treatment, she became afebrile and has remained so ever since. When seen on Feb. 26 and March 25 (two months' follow-up) she was in normal health.

Discussion

Two cases of abortus fever (one having a rare complication) successfully treated with sulphonamides and blood transfusion is added to the two of Holmes and Hughes (1948). In Case 1 sulphamezathine and a single transfusion of 1 pint of fresh blood were used, beginning three weeks from the onset of the disease. Three weeks later the patient was discharged cured, and remained so. Holmes and Hughes used sulphadiazine and three small transfusions; their cases were treated eight weeks and six weeks from the onset, and were discharged after two weeks' treatment. This is encouraging in a disease which commonly has a long duration (Price gives an average length of three to four months, while Saville mentions three to six months). In the literature no reference to thrombosis of the central retinal vein in abortus fever has been found.

Although two swallows do not make a summer, and this treatment of abortus fever has been criticized by Professor Debono (1949), it seems only reasonable to conclude that the strain of *Br. abortus* met with in this country is sensitive to such treatment. The results certainly justify further trial.

My thanks are due to Dr. J. O. Terry, under whose care the patients were, and to Mr. I. Lloyd-Johnstone for his report upon the condition of the eyes in Case 1.

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The annual general meeting of the Society for Relief of Widows and Orphans of Medical Men was held on June 1. Dr. Alison Glover, a vice-president, was in the chair. The annual report and financial statement for 1948 was approved. At present the membership of the society is 250. Forty-six widows are in receipt of grants, and the total sum distributed during the year was £4,545. Income exceeded expenditure by £802 9s. 2d. It was decided that by-law 48 should be amended so that any widow whose annual income does not exceed £150 will be eligible for grants, as compared with an annual income of £125 as at present. The meeting concluded by passing a vote of thanks to Sir Robert A. Young, the president, for his services during the past year. Membership of the society is open to any practitioner living within a 20-miles radius of Charing Cross, and further details may be obtained on application to the secretary of the society, 11, Chandos Street, W.1.