to be ++. The cephalin flocculation test done on the blood of these two cases was ++ in one case and +++ in the other. Blood smears showed the presence of *P. falciparum* in both cases. In a case of chronic malaria with splenomegaly the cephalin flocculation test on the splenic blood was +++, while on the peripheral blood it was +++++, despite the fact that no malaria parasites could be demonstrated from either the splenic puncture material or the peripheral blood.

On the basis of the above data it seems reasonable to conclude that the cephalin flocculation test is an index of malarial activity in the tissues of the host.

Group 3: Cases in which Malaria and Liver Disease were Ruled Out (Controls)

This group of 90 cases consisted of subjects observed in the A.U.B. Hospital wards, and may be considered as a group of controls.

Results.—In all cases the cephalin flocculation test was negative.

Discussion

In this paper I have presented evidence that in the great majority of malaria cases the cephalin flocculation test is positive to a significant degree. The percentage of positive tests was greater than the percentage of positive smears in our series. The fact that the test became positive near the onset of clinically recognizable symptoms should facilitate an early diagnosis of malaria where infectious hepatitis is ruled out, even though splenic enlargement may not be noted and blood films may still be negative for plasmodia.

I suggest that the cephalin-cholesterol flocculation test be carried out as a routine on all prospective blood-bank donors, and that all positive reactors be excluded as possible carriers of malaria or infectious hepatitis. The need for the application of such a procedure to persons who have been in highly malarious areas, particularly returning personnel of the armed Services, is obvious. The simplicity, reliability, and established significance of this test in infectious hepatitis and chronic malaria make it the obvious method of choice for routine use.

Summary

The cephalin flocculation test was done on sera obtained from 105 malaria cases. A positive flocculation reaction was obtained in 96 cases (91.4%), it being ++ and above in 94 cases (89.5%). The proportion of positive smears was 73.7% (77 cases).

The cephalin flocculation test tended to become negative with antimalarial treatment. It thus may be used safely as an index of the activity of malaria parasites in the host.

Use of the test on cerebrospinal fluid is suggested in cerebral malaria to determine the degree of activity of the infection.

Routine use of the cephalin test on all prospective blood-bank donors is also suggested.

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REFERENCES

- Hanger, F. M. (1938). *Trans. Ass. Amer. Phys.*, **53**, 148.
 — (1939). *J. clin. Invest.*, **18**, 261.
 — and Patek, A. J. (1941). *Amer. J. med. Sci.*, **202**, 48.
 Mateer, J. G., Baltz, J. I., Marion, D. F., and Hollands, R. A. (1942). *Amer. J. digest. Dis.*, **9**, 13.
 Nadler, S. B., and Butler, M. F. (1942). *Surgery*, **11**, 732.

The Minister of Health has made an Order under Section 2 of the Water Act, 1945, dealing with the constitution of the new statutory Central Advisory Water Committee, which will be set up in due course. The Order follows the lines of that for the Central Housing Advisory Committee, by providing that the Minister himself shall be in the chair and the Parliamentary Secretary will be the vice-chairman. The committee will have twenty other members, and, like the previous non-statutory committee under the chairmanship of Lord Milne, will represent all the interests concerned with water-supply matters. Members will be appointed for four years with 50% retirement every two years.

SOME PAEDIATRIC PROBLEMS PRESENTED AT BELSEN CAMP

BY

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Looking through the case records from the paediatric department in the Belsen Hospital three cases seem worthy of permanent record.

Case I

A Czech girl aged 14 was found somewhere in the hospital area in a very bad condition with the diagnosis of "heart disease." She was removed to the children's hospital and her case was worked up as fully as possible. She had a past history of typhus in the horror camp. Before admission to the children's hospital the notes on her case stated that she had been suffering from diarrhoea and had shown some oedema. For the latter she had received injections of nicotinic acid and salyrgan, and sulphathiazole by mouth. She was rather big for her given age (probably more than 14 years), was much emaciated, and appeared conscious of her surroundings but unusually apathetic. Temperature 99–102° F.; pulse 120.

On examination cardiac dullness was found to extend some 2½ in. (6.3 cm.) outside the left nipple line and 1½ in. (3.8 cm.) to the right of the sternum and above the third rib. There was no visible pulsation. The heart sounds were normal; no murmurs. There was a cough with a little sputum. Moist sounds were heard all over the chest, most pronounced on the left side. C.N.S.: Reflexes were decreased or absent. The abdomen was thin but not tender; there was intermittent diarrhoea. No oedema was present. The urine was normal. Radiographs revealed considerable enlargement of the heart towards both sides and soft generalized shadows in both lungs. "The appearance suggests dilatation seen in initial stages of mitral disease, and the lung condition is compatible with pulmonary passive congestion" (see Fig. 1). The blood sedimentation rate for the

FIG. 1.—Skiagram of Case I, June 1, 1945.

first hour was 144 mm. (Westergren); blood urea, 12 mg./100 c.cm.; plasma protein, 6.5 mg./100 c.cm.; haematocrit, 26; colour index, 0.9; haemoglobin, 55%; red blood cells, 2,960,000; white blood cells, 5,800 (polymorphs 62%, lymphocytes 30%)*: normocytic normochromic anaemia; no iron deficiency.

After discussion pericarditis was considered to be the most probable diagnosis, taking into account the temperature, the size of the heart, and the lack of murmurs. Aspiration of the pericardium was attempted, the posterior route being chosen. The needle was

* Blood examinations carried out by Capt. P. L. Mollison.

pushed slowly as far as the heart muscle and slowly withdrawn, but only a few drops of blood entered the syringe.

We considered the matter again in the light of this finding, and felt that the most likely diagnosis was still pericarditis, probably tuberculous, with pus too thick to pass through the needle. The possibility of a pure dilatation due to vitamin B deficiency was also considered, and the child was given a diet rich in vitamin B₁ and later injections of thiamine hydrochloride. The nicotinic acid injections were also continued. Within a week the child's appearance had quite altered. Her temperature fell to normal; she ceased to be apathetic, but remained unresponsive and somewhat hostile, though by this time all the other children in the beds around her had lost their terror symptoms. Later the temperature rose again, though not to the same height as before, but her clinical improvement was continuous. We now decided to include her among the cases for evacuation to Sweden. (Previously her condition had seemed too bad to warrant this.) She stood the journey well and was admitted to the Lung Clinic in Malmö. Here she was x-rayed again exactly one month after the previous film. The heart (Fig. 2)

FIG. 2.—Skiagram of Case I, July 23, 1945.

had now come in completely; the skiagram shows, however, a considerable degree of pulmonary tuberculosis, accounting for the temperature.

One of us (W. R. F. C.) took the skiagrams to Stockholm, where he discussed the case with Prof. A. Wallgren and others. Prof. Wallgren felt that the diagnosis rested between a pure dilatation of the heart—probably of the B₁-deficiency type—or a serous effusion which had cleared up. He showed a case of the latter from his records. The general opinion leaned towards the diagnosis of a beriberi heart.

Comment on Case I

Other observers (Collis, 1945; Lipscomb, 1945; Vaughan *et al.*, 1945; Mollison, 1946) at Belsen have said that frank vitamin deficiency syndromes were rare among the adult population. Among the children we saw no case of vitamin A deficiency or scurvy, nor did we observe any case of active radiological rickets. Tetany was not uncommon, however, and many cases were undoubtedly suffering from a derangement of the calcium-phosphorus balance. Lack of facilities made it impossible for us to investigate the blood calcium, phosphorus, and phosphatase. Vitamin B deficiency (both B₁ and B₂) was, however, not uncommon. Although we did not see textbook cases of beriberi or pellagra, many of the children had lost their reflexes and had defective balance; others showed a non-infective type of diarrhoea which improved with nicotinic acid. They also showed stomatitis, glossitis, and marked pigmentation of exposed parts of the skin. Hence it is not improbable that the above case is a true beriberi heart.

Case II

This case will be of interest because of its association with tuberculous allergy and the aetiology of erythema nodosum. L. G., a boy aged 9, while in hospital suffering from a slight cold was tuberculin-tested as a routine, with a negative result. Six days later the temperature rose sharply and continued to climb, reaching 103° F. in five days. On the second day of the fever the typical red raised eruptions of erythema nodosum appeared on the extensor surfaces

of the legs. The following day he was again tuberculin-tested, and the reaction had now become positive. His skiagram showed a typical early primary lesion around the hilus of each lung, spreading out into the parenchyma, particularly on the right side. The sedimentation rate was 120 mm. (first hour Westergren).

This case shows the classical picture of the primary tuberculous state in a heavily infected child with a rapidly developing high allergy and erythema nodosum.

Comment on Case II

After the typhus, starvation, and fear syndromes had been overcome the final clinical problem among the children was tuberculosis. We calculated that typhus combined with starvation had reactivated over 1,000 cases of pulmonary tuberculosis in the camp. Hence it was not surprising that a very high percentage of the children were infected. In a survey carried out by one of us (P. C. M., assisted by M. John Moerman, Ghent Medical School) 80% of the children were found to be Pirquet-positive (average age in group, 7.1 years).

Every phase of the disease was observed. We saw children, as above, at the beginning of their allergic response, in the primary complex, others healing, and others healed. There was a group of about ten showing secondary generalized spread (miliary tuberculosis, caseous bronchopneumonia, and tuberculous meningitis), and seven cases of the adult type of phthisis in children aged from 9 to 15.

It will be of interest to many to hear that the Swedish Red Cross took all but the dying patients to Sweden, where already all the primary cases are well on their way to recovery and most of the tertiary (adult type) are greatly improved.

Sedimentation Rate:—Mollison (1946) observed that the sedimentation rate was greatly increased in starvation states at Belsen, and that its return to normal took usually some two months. We carried out the sedimentation test in over 100 children, and repeated it on several subsequent occasions in many. Starvation alone seldom produced a sedimentation rate of over 50 mm. for the first hour. But when combined with the post-typhus state and tuberculosis the most surprising results were recorded, as in the cases above. The record was 147 mm. in the first hour (Westergren). In spite of this, however, we found the test of very great value in assessing the degree of activity to tuberculosis and the progress of our cases generally when repeated at regular intervals.

Case III

A boy, Z. Z., aged 5, was admitted to the children's hospital, Belsen, from the general hospital on the death of his mother. His mother, an Austrian Catholic, died at Belsen of typhus. The father, a Slovak Jew, last heard of in Sachsenhausen, was probably dead. A sister, aged 6, was alive and well in camp. Two other children died in Ravensbrück lager. Nothing was known of the patient's past history.

On admission he was very emaciated. He lay rolled up in a ball under the bedclothes, moaning, and wouldn't eat or speak. Examination revealed pleurisy with an effusion on the right side, and some infiltration in the right and the upper zone of the left lung. The temperature was irregular, rising to 101°. Sedimentation rate, 101 mm. first hour (Westergren). Pirquet plus. 10 c.cm. of serous fluid was aspirated to exclude empyema.

The child was hand-fed with specially appetizing meals while being talked to in his own language. He was given a high-protein diet with an addition of vitamins and calcium, and at first was kept in a warm room; later he was placed in the open air. After one week he began to talk; after two weeks his appetite returned; and after eight weeks the sedimentation rate was 50 mm. He was then evacuated to Sweden. The latest report states that he has put on 7 lb. (3.2 kg.) and is now almost well.

Comment on Case III

The above case illustrates the final problem of the Belsen children. It is a social one of the most profound complexity. Here we have a little boy of 5, together with his sister of 6, whose parents have been cruelly murdered and whose family and home have been destroyed. What is to become of him? Is he to be brought up Jew or Catholic? Is he to be left in an orphanage? He has found a temporary refuge in Sweden, but what of the future?

The work reported above was greatly assisted by M. John Moerman and other members of the Shaef Medical (Belgian) Mission. Our thanks are due to the senior medical officers and officers

commanding the 9th, 29th, and 81st British General Hospitals, and to Dr. Jacobson, Swedish Red Cross, Malmö, who supplied us with the radiograph reproduced in Fig. 2. We would also like to pay a tribute to the work done by the sisters (both Q.A.I.M.N.S. and B.R.C.S.) and all others who assisted in the creation of the children's hospital at Belsen.

Many of the special supplies were sent out by the British Red Cross Commission for Civilian Relief from London.

REFERENCES

- Collis, W. R. F. (1945). *British Medical Journal*, 1, 814.
Lipscomb, F. M. (1945). *Lancet*, 2, 313.
Mollison, P. L. (1946). *British Medical Journal*, 1, 4.
Vaughan, J., Dent, C., and Pitt-Rivers, R. (1945). *Proc. roy. Soc. Med.*, 38, 395.

SPONTANEOUS RUPTURE OF THE LIVER COMPLICATING PREGNANCY

BY

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If the rarity of a condition justifies its publication then the recording of this case is justified. Only one case of spontaneous rupture of the liver complicating pregnancy can be found in the literature, but there are some 28 cases of spontaneous rupture from other causes.

As early as 1844 Abercrombie reported a case of rupture of the liver complicating pregnancy. The patient, a woman have been trauma. The patient, a woman aged 35, was accustomed to obtaining relief from gastrodynia by tying a silk handkerchief round her waist. Unhappily, however (on the occasion recorded), her servant pulled so tightly that Abercrombie in his description states that "it made me fear some injury." Labour began and delivery quickly followed, and within 50 minutes the patient collapsed. At necropsy two lacerations about 1 in. (2.5 cm.) apart were found in the liver. In the case reported below there is no history of trauma.

In 1943 Rademaker reported a case of spontaneous rupture of the liver complicating pregnancy. The patient, a woman aged 32, was eight months pregnant when she suddenly developed signs of toxæmia with albuminuria and a blood pressure of 240/160. After a bout of vomiting she showed signs of intraperitoneal haemorrhage, and an operation was performed, during which lacerations in the liver were found and packed. Hysterectomy and bilateral salpingo-oophorectomy were also carried out, because "there seemed to be an opening in the uterus," and "this procedure was the quickest means of removal of the foetus and the uterus to prevent any further bleeding from that source." The patient recovered after a very stormy post-operative period. In Rademaker's opinion the high blood pressure and the sudden muscular effort caused the rupture of hepatic vessels, which had been rendered pathological by the toxæmia. In the case here reported there was nothing in the history to suggest the presence of a toxæmic state, nor was there any record of a violent muscular effort. Rademaker further suggested that perhaps some of the sudden deaths occurring in eclampsia might be due to undiagnosed rupture of the liver.

Spontaneous rupture of the liver also occurs rarely as a complication of some pathological condition in that organ, the chief causes of which are carcinoma, syphilis, and such febrile states as malaria, typhoid fever, and pneumonia. Still less frequently rupture has occurred as a result of a biliary stasis and arteriosclerosis. Devic and Bériel (1906), having reviewed the literature, formulated the theory that haemorrhage was the cause of the rupture in these spontaneous cases, whereas in traumatic cases rupture was the cause of the haemorrhage. In the spontaneous cases they considered the sequence of pathological events to be infarction, hypervascularization at the periphery, and rupture of a vessel. Clearly a gumma or carcinoma by eroding through a blood vessel may cause a haemorrhage, as an aneurysm or haemangioma may rupture spontaneously. None of these possible aetiological causes is to be found in the present case.

Case Report

At 10 p.m. on Sept. 25, 1945, Mrs. A., aged 42, was admitted to hospital as an "acute abdomen" case. Apart from the usual child-

hood ailments—e.g., scarlet fever, measles, and chicken-pox—she had remained well until the day of admission. She had had two former pregnancies, both of which had terminated in normal deliveries, nine years and six years previously. The children were alive and healthy, as also was the husband. The present pregnancy was of 16 weeks' duration, and the patient, who had been well throughout, had not sought medical advice. Twelve hours before admission she experienced sudden violent abdominal pain. At this time she was seated peeling potatoes and had not at any time during the morning done anything calling for muscular exertion. The pain was localized to the right hypochondrium, and was of such intensity as to cause collapse. She was put to bed, where she remained until her transfer to hospital.

On admission the patient's appearance was one of marked pallor and anxious depression. She lay curled up on her left side and moved only with great effort. She complained of generalized abdominal pain, particularly on deep inspiration. The abdomen was enlarged but moved on respiration. A small umbilical hernia was present, the dome of which was observed to be bluish in colour. On palpation the uterus was enlarged to about 1 in. (2.5 cm.) below the umbilicus, and this was consistent with the period of amenorrhoea. There was generalized tenderness without rigidity but with a relative resistance of her right upper rectus muscle. On percussion, shifting dullness was found to be present; the area of hepatic dullness was normal. Rectal examination revealed an enlarged uterus and generalized tenderness; no other mass was palpable. The pulse was of poor volume, the rate 140 per minute; the temperature was 99.4° and the blood pressure 110/70. Urinary examination revealed a specific gravity of 1020 and no abnormal chemical constituents. A pre-operative diagnosis of haemoperitoneum, probably due to a gynaecological cause, was made.

A blood transfusion was begun and an operation was performed one hour after admission. The anaesthetic administered was nitrous oxide, ether, and oxygen. A right lower paramedian incision was made. On opening the abdomen the peritoneal cavity was found to be full of blood. The pelvis was inspected, but no cause for haemorrhage could be found in the uterus or its adnexa—the only abnormality being a small follicular cyst of the right ovary. The incision was continued upwards, the spleen was inspected and found to be normal, clots were seen in the right hypochondrium, and blood was coming through the foramen of Winslow. The gastro-hepatic omentum was incised and blood clot was found in the lesser sac. A transverse rupture about 2 in. (5 cm.) in length was located in the caudate lobe of the liver. At the place of rupture the liver appeared as though it had been incised by a knife, the edges of the laceration being clean-cut; apart from the rupture the liver seemed to be normal. The laceration was bleeding actively, and surface diathermy was used in an attempt to stop it. This was unsuccessful, and the rupture was then plugged with a piece of the right rectus muscle. This brought about the arrest of the haemorrhage. The abdomen was closed in the usual manner without drainage. The patient, who was in poor condition, was returned to the ward, and the transfusion was continued until a total of three pints (1.7 litres) of blood had been given.

Post-operatively the patient made a rapid recovery. She miscarried on Sept. 30, but, apart from a temporary mental confusion with rise of pulse and temperature, suffered no ill effects. A blood examination carried out on Oct. 11 revealed that the Wassermann and Kahn reactions were negative. The haemoglobin was 60%, red cells were 2,790,000 per c.mm., white cells 3,600 per c.mm., and colour index 1.07. The differential white cell count was 73% polymorphs, 18% lymphocytes, 1% eosinophils, and 8% hyalines.

The patient was discharged from hospital on Oct. 18, 1945. The wound was then soundly healed and she was symptom-free.

Follow-up.—On Dec. 11, 1945, the patient attended the follow-up clinic in the out-patients' department. She looked amazingly well and was symptom-free. Her blood picture had improved considerably, as the haemoglobin was now 95%, the red cell count 4,890,000, and the white cell count 7,600. The blood-pressure reading was 120/80.

Conclusion

With the conspicuous absence of positive findings one is left to speculate as to the possible cause of this unusual condition. One fact may be worthy of consideration: even after such a massive haemorrhage as the patient had sustained she still had a systolic blood pressure of 110 mm. Hg. Further, attention may be drawn to the apparent discrepancy between this blood-pressure reading and the rapid (140 per minute) feeble pulse and profound state of shock which she displayed on admission. Is it, then, reasonable to suppose that she was hypertensive before the rupture occurred, and that this hypertension superimposed on the hyperaemic pregnant liver caused the rupture of the organ? If this assumption is correct it would be consistent with the findings in the case reported by Rademaker.