diagnosed as having bronchiectasis, had been down-graded to 3, and his discharge from the R.A.F. had been recommended at another hospital. We found no evidence in support of this diagnosis and did not act on the recommendation. Case 7 was also incorrectly labelled "bronchiectasis." This seems to be the important point arising from these cases—namely, that a chronic cough and clubbed fingers are not sufficient for a diagnosis of bronchiectasis, with its consequent gloomy prognosis, although it is apparently not rare for this combination to be so evaluated without exclusive investigation having been made.

Cases with Unusual Features

Other cases showing clubbing that were seen in the same period seem worthy of note because of unusual features.

Case 9: Rheumatic Heart Disease.—A boy aged 8 was admitted with chorea. Two years previously he had had the same malady. There were perfectly typical physical signs of well-established aortic incompetence and mitral stenosis, but there was no suggestion of congenital heart disease in his history or on physical or radiological examination. His fingers and toes were markedly clubbed. There were no signs of heart failure. His parents had not noticed the unusual shape of his fingers until it was pointed out to them. There was no family history of clubbing.

Case 10: Cardiac Failure.—A man aged 53 was admitted to hospital in a state of congestive heart failure, with bilateral hydrothorax. His history of shortness of breath went back six months. There was no history of cough or of previous chest trouble. He showed early but definite clubbing of the fingers. The cause of the heart failure was doubtful; there was no evidence of valvular disease and the blood pressure was not raised, although the apex thrust was beyond the nipple line. After aspiration of the chest and routine treatment an x-ray film of the lungs was entirely clear except for rather heavy root markings.

Comment.—Chronic congestive heart failure with mitral stenosis is an established cause of clubbing and was described by Thorburn in 1893, but clubbing in other types of failure without congenital lesions, and clubbing associated with rheumatic heart disease without failure, must be rare. Could the hydrothoraces in Case 10 be the salient factor in its development?

Case 11: Primary Lung Cancer.—A sailor aged 46 was admitted with the symptoms and signs of a space-occupying lesion in the left post-Rolandic area of the brain. Otherwise he had no complaints or physical signs except for clubbing of his fingers. An x-ray film of the chest showed a small faint round shadow in about the centre of the left lower lobe. At necropsy this shadow was found to have been caused by a primary carcinoma no bigger than 1 in. (2.5 cm.) in diameter. There were secondaries in the brain, but the lungs were otherwise normal. That so small a lesion should have produced clubbing is yet a further argument against the operation of a mechanical pulmonary factor in the production of this condition. Similar cases have been previously reported (Mendlowitz, 1942).

Case 12: Infective Hepatitis.—A boy aged 8 was admitted with typical mild infective hepatitis. His liver was palpable and he was moderately jaundiced. His fingers were normal on admission but showed marked clubbing after a fortnight. Unfortunately I do not know what happened to him later. Although hepatitis is a recognized uncommon cause of clubbing, such rapidity of development is rare in conditions other than empyema and lung abscess.

Summary

Some cases of clubbed fingers with certain unusual features are briefly reported. It is particularly stressed that clubbing by itself may be of little significance, and when combined with a chronic cough is not sufficient to justify a diagnosis of bronchiectasis, although measures should certainly be taken to exclude this possibility.

It is realized that only one of these cases came to necropsy for final confirmation; but, clinically and from a practical standpoint, there was no doubt about the correctness of the interpretations.

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A CASE OF CONGENITAL TUBERCULOSIS

BY

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In previous reviews of the literature of congenital tuberculosis (Beitzke, 1935; Hughesdon, 1946), only eight cases of which appear to have been reported in this country up to 1946, the difficulty of proving the congenital origin of the disease has always been stressed. This difficulty is usually all the greater because important evidence is often lost through the destruction of the placenta at the time of birth. Proof of many of the cases reported has therefore had to rest on circumstantial evidence and on the exclusion of possible extrauterine causes of infection. Dorothy Price (1948) has laid down three requirements for establishment of the congenital origin of the tuberculous infection; they are, (1) proof of tuberculous infection in the mother, (2) demonstration of tuberculous infection in the child, and (3) exclusion of the possibility of infection of the child after birth.

It has been customary to group cases of congenital tuberculosis into two main types—those in which infection reaches the foetus via the umbilical vein, and those in which it arises from infected amniotic fluid. This second mode of infection usually occurs through ingestion of such fluid by the foetus, in which case the primary seat of the disease is in the intestinal tract, resulting in enlargement of the mesenteric glands and later of the glands of the porta hepatis. It has also been maintained that infection from amniotic fluid may be caused by aspiration of the fluid into the air passages. The view that the foetal lung is normally capable of respiratory movement, so that amniotic fluid may enter the alveoli, as maintained by Snyder and Rosenfeld (1937), has been contested by Whitehead *et al.* (1942), who showed that in guinea-pigs this did not occur. They observed that, so long as anoxial conditions were avoided, thorotrast injected into the amniotic fluid was not aspirated into the lungs. Thus the view that congenital tuberculosis may have its origin in aspiration of infected fluid, except possibly during parturition, must at least be open to doubt.

Hughesdon (1946), in a review of 35 cases described between 1935 and 1945, states that the average duration of extrauterine life was 36.5 days in those cases in which it was stated. A few of the patients lived for a considerably longer period. In every case the tuberculous lesions found at necropsy were commensurate with an infection of much longer standing than the duration of extrauterine life.

Almost all such cases showed at necropsy a miliary blood-stream spread of the disease irrespective of the mode of origin of the infection.

In their clinical course most of the cases of the ingestion type of infection have shown a certain similarity; at birth the child appeared to be normal and for a time gained weight, but later loss of weight, diarrhoea, and sometimes jaundice appeared, and death rapidly ensued in a few days. The case reported below followed such a course. Both the infant and the mother died within a short time of each other, and in both cases a post-mortem examination was carried out.

Case Record

A woman aged 31 was discovered on routine antenatal examination in October, 1947, to be suffering from pulmonary tuberculosis. She was admitted to Grove Park Hospital on Oct. 25, and subsequently was transferred to Lewisham Hospital, where there is a special unit for tuberculous patients in the obstetric department. She was delivered on May 2, 1948. Labour was spontaneous and lasted 15½ hours, but was accompanied by a severe post-partum haemorrhage of about 3 pints (1.7 litres). The placenta was expressed but was incomplete, the small remaining portion being removed from the uterus four hours after completion of the second stage. No other abnormality of the placenta was observed. The infant was immediately isolated from the mother, who on the day following delivery developed a pyrexia ranging between 99.6 and 102° F. (37.55 and 38.9° C.). The mother died about three weeks later.

The infant was a full-term male child, apparently quite healthy. Its weight at birth was 8 lb. 14 oz. (4 kg.). Progress was satisfactory, and on the seventeenth day he was transferred to a nursery, routine medical examination at this time revealing no abnormality. On the twenty-second day it was observed that he was taking his feeds poorly and was lethargic, and the temperature had risen to 101.6° F. (38.7° C.). The abdomen was distended and there was a mild degree of jaundice. On the twenty-sixth day he was transferred to hospital, where on examination the temperature was found to be slightly raised, the abdomen distended, and the spleen greatly enlarged, extending downwards into the left iliac fossa. The liver was also somewhat enlarged, and the sclerae and skin were slightly jaundiced. The infant was not dehydrated. A blood count at the time showed: red cells 3,300,000 per c.mm.; haemoglobin, 64% (Haldane); white cells, 11,100 per c.mm. (56% polymorphonuclear leucocytes, 36% lymphocytes, and 8% monocytes); there were also a small number of primitive red cells. The blood Wassermann reaction was negative.

While in hospital the difficulty of getting the child to take his feeds persisted, the jaundice became deeper, and the stools were relaxed and offensive. Four days after admission—that is, thirty days after birth—he died.

All the staff who came into contact with the infant, both in the hospital in which he was born and in the nursery to which he was subsequently removed, were later examined radiologically for tuberculosis, with negative results.

Pathological Reports

Post-mortem Examination of the Mother.—*Generally disseminated tuberculosis; tuberculous peritonitis and salpingitis; chronic pulmonary tuberculosis.*—Cavities (up to 2 cm. in diameter) with adjacent fibrocaseous nodules in upper lobes of both lungs. Numerous miliary granulomatous tubercles in lungs. Dense fibrous adhesions at left apex, obliterating left pleural cavity. No macroscopic tuberculous infection in hilar lymphatic glands. Bilateral chronic fibrocaseous tuberculous salpingitis; caseous material in lumina of fibrotic Fallopian tubes; subinvolution of uterus, compatible in size with a four-months pregnancy; slight purulent endometritis with fibrin and blood clot still attached to the shrunken placental site. Slightly serous caseogranulomatous tuberculous peritonitis, with adhesions between the loops of intestine. Granulomatous tubercles in posterior abdominal lymphatic glands. Miliary granulomatous tubercles in spleen, kidneys, and liver. Slight subendocardial fatty change in ventricular walls of heart. Slight congestion of surface of brain. No abnormalities in

stomach and intestines and endocrine system. Physiological activity of breasts. A slightly wasted, well-developed woman.

The chief findings included chronic bilateral pulmonary tuberculosis and cavitation with superadded terminal miliary tuberculosis. In addition there was a chronic bilateral tuberculous salpingitis, which had almost certainly been present during at least the latter few months of the last pregnancy, and a more recent generalized hyperplastic tuberculous peritonitis.

Post-mortem Examination of the Infant (Dr. A. B. Bratton).—*Generally disseminated tuberculosis; caseous tuberculosis of lymphatic glands in hilum of liver.*—A wasted, well-developed infant showing slight jaundice of sclerae. Mass (2.5 cm. in diameter) of caseous lymphatic glands in hilum of liver; smaller caseous, coeliac, para-aortic, and lumbar glands; caseous glands (up to 1.5 by 0.7 cm.) at bifurcation of trachea and in hila of both lungs. Very numerous caseous nodules varying from a pin's head to 1.6 cm. diameter in enlarged spleen (7.5 by 5 by 4.5 cm.) (see Fig.). Caseous tubercles up to 0.2 cm. diameter

Photograph of the child's spleen, showing the large caseous areas and enlarged lymphatic glands in the hilum.

and submiliary granulomatous tubercles scattered through liver. A few submiliary granulomatous tubercles in and cloudy swelling of kidney. Two caseous foci (largest 0.4 cm. in diameter) in lower lobe of right lung and one in lower lobe of left; a few miliary granulomatous tubercles and an occasional area of caseating bronchopneumonia in rest of lungs. Cloudy swelling of myocardium. Oedema of pancreas. No abnormality in adrenals, stomach, intestines, bladder, prostate, or testes. Oedema and congestion of brain.

The lesions in the spleen and lung contained masses of acid-fast and alcohol-fast bacilli in Ziehl-Neelsen stained sections. Many of the lesions were advanced and appeared to be at least a month old. No primary focus was found in any of the usual sites. The most severe lesions were in the glands in the hilum of the liver; these had caused jaundice by pressure on the bile ducts.

Comment

We consider this case to be one of congenital tuberculosis for the following reasons: (1) The clinical course of the child's extrauterine life was similar to that of other cases recorded. (2) Post-mortem examination showed tuberculous lesions commensurate in size and distribution with intrauterine infection. Whether these were due to blood-borne infection through the umbilical vein or to ingestion of infected amniotic fluid is uncertain, but infection was more likely to have been through the former route, as the glands in the porta hepatis were those most enlarged. (3) Post-mortem examination of the mother subsequently revealed active genital tuberculous lesions, which were certainly present during the latter part of the intrauterine life of the child. (4) Immediate removal of the child from contact with the mother and failure to find any subsequent source of tuberculous infection among members of the

staff attending the child make it almost certain that the mother was the source of infection.

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THE MEAT RATION AND BLOOD LEVELS INVESTIGATION OF INDIAN SOLDIERS IN PERSIA AND IRAQ, 1944

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The striking contrast between the vegetarians and the meat-eaters of the Indian soldier population at Shaiba (Iraq) in the incidence, severity, and type of anaemia suffered (Taylor and Chhuttani, 1945) promoted an investigation into the blood levels of the apparently healthy men on full duty.

The garrison had about 17,000 meat-eaters and 1,188 vegetarians. Two units (S and B), each with a strength of over 500 men and well over 50 vegetarians, were chosen because among the vegetarians in unit S the incidence of nutritional macrocytic anaemia was high whereas unit B was the only major unit without a single case of anaemia for at least a year previous to the time of the investigation. The material was not selected, any two meat-eating and vegetarian soldiers being sent each day by unit authorities from among those who were doing full duties.

Blood was taken in oxalated flasks from the vein first thing in the morning, before breakfast, and sternal puncture was performed at the same time. In addition to a full clinical examination, including search for signs of malnutrition, stools were examined for helminthic and protozoal infection in all cases. The haematological investigations were carried out in the field laboratory attached to the hospital by the workers who had done the anaemia cases; they were not aware of the clinical features or the dietetic habits. Cytological nomenclature and the haematological technique of the earlier investigation were adhered to (after Napier and Das Gupta, 1942). The erythrocyte sedimentation rate was estimated by Wintrobe's tubes before spinning them for corpuscular volume estimation.

Forty meat-eaters and forty-two vegetarians from unit S were examined during August–November, 1944. The inquiry had to be suspended when twelve unit B men from each batch had been examined; the data yielded by this unit are thus referred to for one significant feature only. Men from unit S had been in Shaiba for one and a half years and the majority were from United Provinces of India.

The meat-eaters and the vegetarians were served from the same kitchens. The vegetarians had never taken meat

or eggs in their whole life. We often visited unit S camp to acquaint ourselves with the living, eating, and working conditions of the two dietetic groups; these were found to be alike in all respects except that the vegetarians on account of their social customs did not consume the weekly ration of 20 oz. (570 g.) of fresh mutton. The unit was carrying out pioneer duties of a heavy nature entailing a 44-hour week.

The daily rations were: 18 oz. (510 g.) of atta (wheat flour) or rice, 2½ oz. (70 g.) of dal (pulses), 3¼ oz. (92 g.) of ghee (clarified butter or vegetable oil), ¼ oz. (19 g.) of condiments, 2 oz. (57 g.) of onions, 2 oz. of potatoes, 4 oz. (114 g.) of fresh vegetables, 2 oz. of unsweetened tinned milk, and 6 oz. (170 g.) of fresh mutton with bone for five days in the week. Leafy vegetables were issued for only a few months of the year. In lieu of fresh meat vegetarians were allowed 4½ oz. (128 g.) of tinned milk three days a week and ¾ oz. (21 g.) of ghee and 3 oz. (85 g.) of atta or rice for two days a week, but none of the vegetarians of unit S had received these. No one had supplemented his rations from canteen or elsewhere. The meat ration of 6 oz. of fresh mutton with bone for five days a week amounted to 4 oz. without bone; this was checked in local carcasses. The total daily intake was over 3,000 calories and over 80 g. of vegetable protein.

Haematological and Clinical Features Peripheral Blood

The various averages obtained are shown in Table I. The average means of red cells and haemoglobin were significantly higher among meat-eaters than among vegetarians (5,550,000 and 4,670,000; 15.44 and 14.32 g.).

TABLE I.—*Haematological Averages of Meat-eaters and Vegetarians*

	Meat-eaters (40)			Vegetarians (42)		
	Range	Mean	S.D.	Range	Mean	S.D.
Red cells (millions/c.mm.)	4.46–6.85	5.55	0.58	1.9–6.6	4.67	0.9
Haemoglobin (g./100 ml.)	11.1–19.6	15.44	1.4	7–17	14.32	1.71
M.C.H.C. %	21.7–35.5	28.25	2.32	23.6–33.7	28.54	1.71
M.C.V. (c.µ)	80–114	96.33	8	80–153	109.48	13.4
E.S.R. (Wintrobe)	1–20	4.43	4.24	1–37	10.64	9.15
Total W.B.C.*	3,000–9,000	6,022	1,843	3,000–9,000	5,600	1,524.2
Neutrophils %	30–72	60.4	10.38	39–74	58.25	9.38
Lymphocytes %	20–62	31.7	10.52	15–55	35.68	10.34
Mononuclears %	1–8	4.64	1.76	1–9	3.86	2.35
Eosinophils %	0–8	2.64	1.76	0–12	2.04	2.59
Basophils %	0–4	0.54	0.91	0–1	0.25	0.44

* For the leucocyte count only 33 meat-eaters and 28 vegetarians were observed.

The range and the distribution around the average mean (the standard deviation), especially of red cell counts, were quite abnormal among vegetarians. Whereas there was only one instance among meat-eaters of a red cell count below 4,500,000, there were seventeen among vegetarians. Eight of the latter had red cell counts of 4,000,000 and below, two showing marked anaemia with red counts of under 2 and under 3 millions per c.mm.; all the eight had an M.C.V. above 110 c.µ. Though the average haemoglobin value for meat-eaters was significantly higher than for vegetarians, the difference was not so marked as with the red cell counts. (The explanation of this selective effect on red cell levels in vegetarians lies in the macrocytic type of blood picture exhibited. In haemopoietic-principle (or principles) deficiency anaemia the red cells suffer more than haemoglobin, but in iron-deficiency anaemia it is the haemoglobin which drops relatively more than red cells.) There were five vegetarians and one meat-eater with a haemoglobin value of less than 13 g. Average mean corpuscular haemoglobin concentration (M.C.H.C.) values were low in both groups, being less than one-third in 29%, but there was no significant difference between the two