considered in relation to general principles. That soya beans compare unfavourably with milk for the treatment of established kwashiorkor may be due entirely to mechanical factors. If this is so, processed soya might be an adequate source of protein, and an acceptable and inexpensive product might be a valuable alternative to or substitute for milk. At present milk is the best-known source of protein. It is probable that supplies of dried skim milk are adequate for this restricted purpose and should continue to be used. Treatment would require only a small fraction of the amount of protein that is needed for prevention. For large-scale prevention, however, elaborately processed foods are not necessary, and are unlikely to be applied successfully. Experience of the way in which some African mothers use patent foods in infant feeding—that is, as they would a powerful medicine, in teaspoonful doses—convinces me that the best results will be obtained from foods that can be used as nearly as possible in their natural form. Soya beans could be used in this way in areas where they are commonly grown and popular, and where methods of preparation and cooking are traditional ones. There are at present few districts in East Africa where such conditions prevail, but it is certain that feeding habits must change, and soya, which grows well in many parts of the country, may come to be accepted in spite of the demands it must make on the time and skill of the housewife. Its acceptability as a supplement for children not suffering from kwashiorkor has been confirmed in this study.

There are, however, already available among locally traditional foods vegetable sources of protein which can be used for small children. Experience of feeding common beans (*Phaseolus vulgaris*) to 16 convalescent children, who had been treated with skim milk initially, shows that such beans can make a contribution to the daily protein intake. In five cases the diet was calculated so that the total protein and calorie intake remained constant before and after the addition of beans (Table III). These children took from one-seventh to one-third of their daily requirements of protein in the form of beans. Their progress was not significantly different from that of children fed wholly on milk. These beans can be prepared in the home, as the carefully controlled cooking needed to destroy the trypsin inhibitor contained in soya beans is unnecessary. Toddlers will not be able to meet all their protein needs from this relatively poor source. If, however, such foods were used as a basis for the diet they could be supplemented with smaller amounts of more expensive protein-rich foods—for example, with milk, small amounts of which are more often available than is generally recognized. Children whose parents keep cows have indeed been admitted to hospital with kwashiorkor, their mothers not being aware that milk was needed after weaning. Dried beef has also been used with good results—mixed with beans for three children, and added to small amounts of milk for three others (Table III).

The value of any food in the prevention of kwashiorkor will depend ultimately on the way it is used in the home. Furthermore, available sources of protein are not being fully used because of ignorance of their value. Education, especially of adults in community centres, clubs, and child-welfare and antenatal clinics, is the first essential. Teaching the needs of the child and how to use readily available home sources of protein may do more in this way than the provision of processed foods, since without education it is unlikely that the latter will prove effective.

Summary and Conclusions

An attempt has been made to compare the effects of milk and soya protein in the treatment of children with kwashiorkor in Uganda.

Milk feeds prepared from reconstituted dried skim-milk powder were given to 35 children, preceded or reinforced with calcium caseinate in a few cases. A daily protein intake of 2.5 g. per kg. body weight was found to be necessary. Most children would take more than

this, but diarrhoea was a troublesome complication in some of those fed on skim milk.

Feeds prepared from soya beans were difficult to administer and had to be abandoned in one-third of the 42 children started on this diet. In the remainder daily protein intake was adequate, though limited to 1.5–2 g. per kg. body weight in the majority. At this level the only significant difference between the two forms of treatment lay in the longer time taken to overcome anorexia with soya than with milk. This may have been due to the different calorie value of the feeds.

Soya alone was as effective as when supplements of vitamin B₁₂ or methionine were added.

The implications of this experience in framing policies for prevention and treatment of kwashiorkor are discussed. It is suggested that milk products should continue to be used for treatment. For prevention, education is the first essential. Much could be done to improve the supply and use of naturally occurring protein sources.

I should like to thank the Director of Medical Services, Uganda, the Medical Superintendent of Mulago Hospital, and Dr. H. C. Trowell for the opportunity to do this work. I am grateful to Dr. R. F. A. Dean for the soya beans and the method of preparing them; to Dr. Mann, Kenya Veterinary Department, for beef powder; and to Dr. T. F. Macrae, Glaxo Ltd., for supplies of casilan. Further, this work would have been impossible without the co-operation of Miss J. Greaves, S.R.N., Mrs. Gilmore, S.R.N., and Mrs. Eddie, S.R.N., who made the feeds; and of Staff Nurse Theresa Kunibira, who fed and cared for the children.

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Medical Memoranda

Reticulum-cell Sarcoma of the Kidneys, Presenting as Motor Paralysis of Lower Limbs and Bladder

The case reported below is of interest because of its rarity and the unusual mode of clinical presentation.

CASE REPORT

An African schoolboy aged 17 was admitted to hospital under my care on July 7, 1954, and died 29 days later. In childhood he had been treated for secondary yaws and an ulcer on his right leg which had taken one year to heal. Fourteen days before admission he had stiffness and pain in the lumbar region on getting out of bed in the morning. He was unsteady on rising and had to hold on to the furniture to avoid falling. The next day he was unable to walk. He had lost weight and had had slight fever for three days.

On examination there was generalized wasting. The cranial nerves and upper limbs were normal. Abdominal reflexes were all absent. He was unable to move his lower limbs. Attempts to do so were accompanied by severe pain in his back. There was no sensory loss. Knee and ankle jerks and also both plantar reflexes were absent. There was complete flaccid paraplegia. His bladder was distended to the umbilicus.

During the 48 hours after admission retention of urine with overflow supervened. Apart from spontaneous

improvement in bladder function seven days after admission, he gradually grew worse and died on August 5. Haematuria appeared a week before death.

Laboratory Findings.—Cerebrospinal fluid: pressure normal—no block; protein, 30 mg. per 100 ml.; cells, 420 per c.mm., mainly lymphocytes; sugar, 62 mg. per 100 ml. Blood: red cells, 4,590,000; white cells, 8,500 (neutrophils 70%, eosinophils 5%, large lymphocytes 24%, monocytes 1%); Hb, 75%; Kahn test +++; no sickling of red cells. Urine: reaction, acid; S. G. 1005; sugar, nil; red blood cells, ++; few pus and epithelial cells; no schistosome ova. X-ray films of the chest and lumbar spine were normal.

Post-mortem Examination. The following were the relevant findings.—*Right kidney*: circular tumour on upper and lateral pole, about 2 in. (5 cm.) diameter growing from kidney substance; weight 400 g.; capsule adherent; section revealed many round pale areas. *Left kidney*: similar, but no tumour bulging out; weight 380 g. *Spinal cord*: blood-stained C.S.F.; no sign of obstruction. *Lumbar vertebrae*: no secondaries seen by naked-eye examination.

Macroscopically there was great blurring of pattern of kidney by diffuse grey infiltration (tumour). Microscopically, the kidney showed wide separation of parenchymal structures by tumour cells. *Spinal cord*: Infiltration with tumour cells was conspicuous in the anterior and posterior roots in the lumbar cord, also in the pia mater but not in the cord substance.

Diagnosis.—Reticulum-cell sarcoma of kidney. Secondary infiltration of lumbar spinal roots.

COMMENT

So far as can be ascertained, a case of this type, presenting in an African aged 17, has never previously been recorded. A search of the literature revealed reports of cases of paraplegia which arose from other types of renal tumour.

Garrow and Keenan (1912) described a case of paraplegia which was, after exploratory operation, said to be a sarcoma, but at necropsy was finally stated to be due to latent hypernephroma with a solitary metastasis in the spine. A similar case was reported by Belz (1912) as being due to metastasis from Grawitz tumour into the lumbar spine. Harvey (1947), in a paper based on a study of 50 malignant renal tumours, stated: "The metastatic symptoms, excluding pain, consisted of sensory and motor disturbances in the legs, due to secondary spinal carcinoma, in three cases." The Kahn test, being positive, was not considered of significance in the face of a history of yaws.

I am grateful to the Director of Medical Services, Sierra Leone, for permission to publish this case; to Professor D. Russell, of the Bernhard Baron Institute of Pathology, London Hospital, for the histological report and her helpful advice and criticisms; and to Dr. R. A. Henson for his helpful advice and criticism.

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Radiological Diagnosis of Splenic Rupture

A case is described of unsuspected splenic rupture diagnosed radiologically 14 days after injury.

CASE HISTORY

A 55-year-old housewife suffered from a mild spastic paraplegia secondary to disk degeneration and had been an out-patient of the neurological department for some years. On one of the routine visits she complained of a slight ache in the left lower chest. On questioning she recalled that 14 days previously she had tripped on the carpet and struck her left side against the settee. She was shaken and went to bed because of the pain. Breathing

was painful, and sleep was possible only when she was propped up in bed. She treated herself with liniment and "pills," and noted slight bruising on her left side. After a few days the pain and difficulty in breathing had disappeared and she was able to resume her normal housework. The accident had almost been forgotten when she attended the neurological out-patient department. As a precaution she was referred to the x-ray department with a query of fractured rib.

Antero-posterior radiographs of the ribs and abdomen showed most of the radiological signs of ruptured spleen—namely, elevated left dome of diaphragm, upward and medial displacement of the stomach, serrated gastric margin, obliteration of the splenic shadow, dense opacity below the left diaphragm, fractured eleventh left rib, and downward and medial displacement of the left kidney. A diagnosis of ruptured spleen and fractured eleventh left rib was made and the patient admitted to hospital.

Close questioning elicited further details: left shoulder pain had been present from shortly after the accident, and for some days she felt "ill in myself," "as though in another world," and, again, "as if I had the 'flu.'" There had been no derangement of bowel habit. She stated that she had recovered completely, apart from the ache and tenderness on the left side. Careful palpation of the abdomen confirmed the radiological diagnosis, and showed the signs of ruptured spleen as described by Hamilton Bailey (1927): abdominal rigidity, more marked in the left upper abdomen; local tenderness (Ballance's sign); slight abdominal distension; shoulder pain (Kehr's sign); and an umbilical "black eye" (Cullen's sign).

In the absence of haematuria, and as the intravenous pyelogram showed normal function in the displaced left kidney, renal damage was excluded.

It was decided to operate. At laparotomy (Mr. Murray) the ruptured spleen was found to be still bleeding and surrounded by a large haematoma. After splenectomy, convalescence was uneventful. Histological examination of the specimen showed no evidence of disease and the serological findings were normal.

COMMENT

Numerous cases of ruptured spleen following relatively slight trauma have been recorded, but the radiological diagnosis of the condition is uncommon.

In the present case antero-posterior radiographs of the chest and abdomen provided adequate information for the radiological diagnosis, but "oblique" views are often of great assistance. Where doubt exists other procedures may be adopted to study the effects on the adnexa of the spleen: on the diaphragm, by fluoroscopy; on the left kidney, by intravenous pyelography; on the stomach, by barium-meal examination; and on the splenic colon, by barium enema. Re-examination during the period of observation is of value in confirming a provisional diagnosis and in assessing the progress of the condition.

This grave accident, with its 75% mortality rate, is often a sequel to injuries of the lower left ribs and abdomen, and its apparently low incidence in hospital records may be due to "missed diagnoses" (Gershon-Cohen *et al.*, 1951).

It is not my province or my purpose to discuss the treatment of splenic rupture, but to reiterate the dictum of McIndoe (1932) that every patient with a left-sided thoracic injury, and especially those with a lower-rib fracture, should be kept under radiological observation.

Permission to publish this case has kindly been given by Sir Harold Graham-Hodgson, Dr. M. Kremer, and Mr. C. J. B. Murray.

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