mycin and chloramphenicol for the treatment of infantile diarrhoea, but merely that there is no evidence that they add anything to that already obtainable with a combination of a sulphonamide and penicillin. This in itself is sufficient to warrant the use of a single antibiotic instead of a combination of drugs. The choice between aureomycin and chloramphenicol would appear to depend as much upon the importance of staphylococci in this condition, and for which aureomycin would be necessary, as upon the coliform organisms which are sensitive to both. In this connexion one may mention that the use of sulphonamides and penicillin in infantile diarrhoea has caused a striking fall in the incidence of middle-ear infections found *post mortem*.

It seems unlikely that these results would be radically altered by merely increasing the number of cases, and it remains to consider the possible effect of the selection of cases. By definition, infantile diarrhoea in this series has been taken to include all cases of diarrhoea in the first year of life which were of non-specific origin. (In practice this excluded only dysentery and coeliac disease.) This wide definition was considered necessary in view of the difficulties of interpretation if any more precise distinctions were attempted. This is true whether the attempted distinctions are clinical, such as the separation of parenteral diarrhoea from enteral diarrhoea, or bacteriological, as in the differentiation of varieties of *Bact. coli*. Whatever the ultimate judgment upon these issues it is worth while to restate the fundamental difficulty in assessing the treatment of infantile diarrhoea. While the aetiology remains in doubt it is unlikely that a specific treatment will be found. Nevertheless it seems legitimate to conclude that the relative ineffectiveness of a wide range of antibacterial substances is strongly suggestive of a non-bacterial causation.

Summary

Aureomycin or chloramphenicol was used in alternate cases of a series of 92 consecutive infants admitted with infantile diarrhoea during a period of eight months. The controls were given penicillin and/or sulphonamides as indicated.

No significant difference was noted between either of the treated series and the controls. It is suggested that any wide-range antibacterial substance is likely to have a definite but limited value in the treatment of infantile diarrhoea. So far, however, it seems that no available antibiotic has a specific curative effect upon this disease. This may be regarded as an additional factor in favour of a non-bacterial causation of infantile diarrhoea.

I am indebted to Professor Stanley Graham, in whose wards these cases were treated, for generous criticism and advice in the preparation of this paper. I am grateful to Dr. A. M. MacDonald and his staff for bacteriological reports and necropsies. To Sister Sutherland and the nursing staff my thanks are due for a consistently high standard of nursing.

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PHAEOCHROMOCYTOMA PRESENTING AS AN ABDOMINAL EMERGENCY

BY

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Phaeochromocytoma is now being recognized more frequently, not only in patients whose clinical features suggest paroxysmal hypertension (Walton, 1950) but also in those whose presenting disability is sustained hypertension (Green, 1946) or diabetes mellitus (Duncan *et al.*, 1944; Goldner, 1947). This clinical diagnosis is usually suggested by the association of two features—a liability to attacks, with palpitations, headaches, and sweating, and evidence of hypertension either persistent or observed during these attacks. In the present case, which was under observation for 18 hours, the clinical picture was dominated for that time by a state of shock with periodic exacerbations associated with severe abdominal pains. The blood pressure was either normal or subnormal, and the E.C.G. and *x*-ray film showed no evidence of previous hypertension. This case is reported because of its unusual presentation, which served to emphasize that the condition of shock, familiar as a post-operative or post-manipulative complication in these patients, may be the presenting clinical problem, thus masking any evidence of previous hypertension.

Case Report

A carpenter aged 29 was admitted to hospital as an emergency case of pneumonia. He had been ill for 24 hours and had become distressed and prostrate, unable even to sit up, coughing up large amounts of blood-stained sputum.

He gave a history of being suddenly struck down the day before with aches and pains all over, and complained particularly of headaches and pains in the abdomen, back, and chest. He said that for the past four months he had had an unproductive cough, which he thought brought on vomiting once or twice a day. With the vomiting he had headache, palpitation, and profuse sweating. On this account he had attended another hospital, where he had had a barium meal and was assured that he was suffering from "nerves." He had lost no weight and had been able to carry on with his work. Further details were not then available, but it was subsequently discovered that he had previously complained of attacks of vomiting, unrelated to meals, occurring almost every night. Headaches, palpitations, and profuse sweating accompanied the vomiting. On the two occasions it was tested his blood pressure was found to be normal. After treatment with phenobarbitone he seemed a little improved and had ceased attending.

On admission he was found to be a robustly built young man, limp, and ashen grey in colour; he was coughing up copious blood-stained sputum, and vomited and sweated profusely. His temperature was 96° F. (35.6° C.), pulse 100, and respiratory rate 30. His blood pressure at this time was 160/80. There were many fine crepitations, especially in the apical regions. There was tenderness in the epigastrium, especially on the left, and in the left renal angle. The urine

showed sugar (orange to Benedict's test), 1 + of albumin, 2.3 g. of chloride per litre, and no pus or blood cells. His E.S.R. was 2 mm. in one hour.

A few hours after admission he was suddenly seized with excruciating abdominal pains, starting in his left flank, severe enough to cause him to roll about the bed in agony. He became suddenly shocked, his blood pressure being unrecordable in either arm, and the whole clinical picture was dominated by collapse, anxiety, and restlessness.

A blood sample removed at the height of the attack was found to contain plasma sodium, 331 mg. per 100 ml.; urea, 57 mg. per 100 ml.; glucose, 121 mg. per 100 ml.; alkali reserve, 49.4; and serum amylase, 115 units per 100 ml. Chest and abdominal *x*-ray films and E.C.G. were normal. His haemoglobin was 112%, W.B.C. 27,000 (88% polymorphs). He was thought to have either a small strangulation or a retroperitoneal haemorrhage of unspecified origin. Our surgical colleagues agreed, and exploration was decided upon after recovery from shock.

In a short while he vomited and became somewhat eased, his blood pressure now being 100/75. In two hours he had to a great extent recovered. His chest signs had completely disappeared and he complained only of tenderness in the left loin.

Two hours later he had a further episode of agonizing pain in the left loin, accompanied by vomiting, during which his extremities were cold, cyanosed, and excessively sweaty. His blood pressure was 110/85. Morphine ¼ gr. (16 mg.), and atropine, 1/100 gr. (0.65 mg.), made him more comfortable, but, in view of a suddenly rising pulse rate reaching 150 a minute, immediate intervention was considered essential. His blood pressure during anaesthetization rose to 170/120.

Operation Notes.—"The abdomen was opened through a left paramedian incision. There was no free fluid in the peritoneal cavity, and no coils of distended small or large bowel were encountered. Medial to the kidney and lying retroperitoneally could be felt a tense rounded tumour the size of a tennis ball. It did not pulsate. The peritoneum on the anterior aspect of the left kidney was incised and the kidney was found to be normal in size, shape, and position. During the delivery of the upper pole of the kidney there was a gush of blood followed by the discharge of several grammes of fragmented heavily blood-stained tissue which looked like a degenerating tumour. At this stage the patient's pulse became impalpable and the pulse rate went up to an unrecordable level. The abdominal wall was quickly closed in layers without drainage. A drip was set up and a concentration of 1 in 500,000 adrenaline was given. This was supplemented by 30 ml. of 'eucortone.' The systolic blood pressure at the end of the operation was 100 and the pulse was still virtually unrecordable. He was sweating, the skin was cold, and his lips were greyish blue. He remained in this condition for about 10 minutes and then expired."

Pathology.—At necropsy a tumour, 5 by 4 by 1.5 in. (12.5 by 10 by 3.75 cm.) was found in the left adrenal gland; little else abnormal was seen apart from congestion of the lungs and spleen and slight cardiac hypertrophy. The microscopical appearance showed the tumour "to be made up of irregularly shaped large cells, in places syncytial, with large vesicular nuclei. Most possess a deeply vacuolated cytoplasm. A few tumour cells show brown pigment granules. Mitoses are infrequent. This histology is typical of a phaeochromocytoma."

Discussion

The analysis of the dramatic disaster which overtook this young man seems clear in retrospect, but the diagnosis was baffling at the time.

The clinical picture was dominated during his brief period under our care by recurring episodes of shock, with low blood pressure and abdominal pain. We had no evidence of his state before admission; his E.C.G. and *x*-ray films were within normal limits; and, indeed, no indisputable evidence of hypertension was obtained until preparations were in hand for exploratory laparotomy, as an acute abdominal emergency. The epigastric discomfort, hypotension, and vomiting led us to consider Addisonian crisis, though there was little suggestive in his sketchy history, no pigmentation or evidence of dehydration; and the relatively normal blood chemistry disposed of this suggestion. Diaphragmatic hernia with obstruction was considered, as was renal colic; the negative *x*-ray findings and the absence of blood and pus in the urine weighed against these. Acute haemorrhagic pancreatitis was thought to be unlikely in view of the excellent interval recovery from his episodic states of shock and the low plasma amylase.

In cases of phaeochromocytoma, shock following operation or manipulation is frequently recorded; but when it is the presenting condition, as in this case and in one case described by Wilkins *et al.* (1950), diagnosis is difficult. It is possible that the haemorrhage into the tumour in this patient accentuated the degree of his shock, and it was no doubt responsible for much of the localized pain in the left loin. When admitted he was suffering from acute left ventricular failure and pulmonary oedema, and had suffered for some months from similar attacks. It was difficult to accept this interpretation at the time, without evidence of a cause for heart failure, with a normal blood pressure and jugular venous pressure, and no abnormality other than tachycardia in the intervals between his acute exacerbations of shock. Wells and Boman (1937) have drawn attention to this possibility, and indeed in one of the first cases to be recorded (Labbe *et al.*, 1922) the patient died in this manner.

The diagnosis of phaeochromocytoma was considered, but unfortunately was discarded, as there was no evidence of previous hypertension by sphygmomanometer, ophthalmoscope, chest *x*-ray film, or E.C.G. Attention has been directed to the frequency of vomiting in attacks of paroxysmal hypertension. Washington *et al.* (1946) record a case which presented because of vomiting every five or six days. Rabin (1929) records the case of a patient who vomited almost every night, as our patient had done when he reported to the other hospital. Wells and Boman found that vomiting was occasionally induced to relieve the symptoms, as it indeed appeared to do in the second episode observed in our patient. The profuse sweating and peripheral vasoconstriction on the second attack in the ward should have indicated an outpouring of adrenal medullary substance (Smithwick *et al.*, 1950). Moreover, we should have taken more account of his unexplained glycosuria and his slightly raised fasting blood sugar of 120 mg. per 100 ml. Rabin drew attention to the presence of unexplained glycosuria in these cases. Occasional cases have no evidence of hyperglycosuria even in an attack (Pantridge and Burrows, 1951), but in most of the cases studied there has been an elevated diabetic-like glucose-tolerance curve, sometimes without glycosuria (Wilkins *et al.*, 1950) and sometimes with frank diabetes (Duncan *et al.*, 1944; Goldner, 1947).

This case also raises the most important therapeutic problem of phaeochromocytoma—how to prevent the shock which may supervene as a result of severe hypertensive attacks, whether spontaneous or after surgical or other manipulation of the tumour.

Effective adrenergic blocking agents able to prevent the hypertensive attacks have been described (Console *et al.*, 1950) and their severe side-reactions discussed (Swan, 1951). Some, such as benzodiozane, act quickly and are useful in the acute hypertensive attack whether spontaneous or provoked by histamine. Others, such as "dibenamine," are slower to act but more prolonged and complete in action, and preliminary reports (Bartels and Cattell, 1950; Crowther, 1951) suggest that these probably offer the best hope of success in preparing the patient for later surgery by preventing the state of shock.

We are grateful to Dr. Russell Fraser and Mr. M. R. Ewing for permission to publish the case, which was under their care.

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HEPATIC COMA WITH RECOVERY IN A CYSTINURIC

BY

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Recovery from hepatic coma is always an event of note. Latner (1950) reported the recovery of four out of five consecutive cases on his regime. Because no one physician is likely to see more than an occasional case of hepatic coma it is important to establish whether these results can be substantiated in other hands in a syndrome in which effective therapy has been conspicuously absent. Communication to Latner or to the medical press of all results of the use of his regime, whether favourable or not, would seem desirable.

It has been suggested that cystine deficiency may be a factor in human liver disease (Himsworth, 1945; Glynn, Himsworth, and Neuberger, 1945). The following case is therefore of especial interest in that one would think a cystinuric, losing as he does fair quantities of cystine continuously into his urine, would be most susceptible to liver disease. This case does not support that idea.

Case Report

The patient was a male physician aged 42 in good health. He had never had jaundice, but had recently attended a jaundiced pregnant woman. On October 10, 1951, he felt feverish and went to bed. Two days later jaundice developed. His fever resolved in a further two to three days, the jaundice increased, and he began to vomit. The vomiting increased in severity until on the sixth day of his illness he could not retain water by mouth. Seen next day, he appeared very depressed and quiet, although mentally alert. He was markedly jaundiced. His liver was easily palpable but not very tender. He had a moist furred tongue and took water and glucose fluids well. He took 100 mg. of pethidine that night because he "could not get mental relaxation," and in the early hours of the following day (eighth day) he took 1½ gr. (0.1 g.) of "seconal" (usual sedative). He then slept deeply and all that day remained drowsy. Fluids were taken well, and he passed 3½ pints (2 litres) of urine. In the early hours of the ninth day, for the first time, he behaved rather oddly—pushing his wife away when getting out of bed.

When seen that morning (October 18) he lay quiet and comatose, unable to recognize relatives or to answer questions. His pupils were widely dilated. He was deeply icteric, with no petechiae. His liver was not palpable, but his respirations were shallow. There was no rise in jugular venous pressure. His blood pressure was 140/90. Ascites was not present. He was admitted to the Lister Hospital as an urgent case and placed on the Latner regime. This consists of two solutions: (*a*) 10% dextrose in normal saline, to each pint (570 ml.) of which are added 50 mg. of thiamin hydrochloride, 150 mg. of nicotinamide, 50 mg. of riboflavin, and 0.5 g. of potassium chloride; (*b*) plasma to which vitamins as in (*a*) but no potassium chloride have been added.

Four pints (2.3 litres) of the dextrose–saline solution were given in 24 hours, but only one pint (570 ml.) of plasma was given (October 19, morning) during the 50 hours in which the intravenous drip was running. Latner recommends three pints (1.7 litres) of dextrose–saline, followed by one pint (570 ml.) of plasma in every 24 hours. There were administered in addition to the intravenous drip: 300 mg. of tocopherol (100 mg. thrice daily) intramuscularly, 60 mg. of vitamin K daily, and 1,000,000 units of penicillin daily.

On the day of admission the patient remained very drowsy and became very restless, necessitating three 5-ml. doses of paraldehyde intramuscularly in the first 24 hours. The next day (October 19) his condition appeared very much the same (coma and restlessness). However, when examined at 5.45 p.m. he just opened his eyelids, and by 8.15 p.m. had become fairly orientated and alert. The intravenous drip was discontinued, after 50 hours, on October 20. During this time he had had 9 pints (5.1 litres) of fluid by drip (glucose 450 g., sodium chloride approximately 12 g.) and 55 oz. (1.6 litres) of fluid by mouth. He was now given tocopherol, B vitamins, and "hepovite" by mouth (Latner). From this time onwards recovery proceeded without significant episodes. He left hospital on November 7 and returned to work on January 8, 1951, feeling very well.

Laboratory Data.—On the day of admission serum bilirubin was 4.8 mg. per 100 ml., thymol turbidity 14 units, prothrombin time 27% (24 seconds), alkaline phosphatase 13.7 units, serum proteins 5 g. % (albumin 3.4 g., globulin 1.6 g.), Hb 106%. Urine examination showed bilirubinuria, urobilinogen and urobilin absent, with a trace of albumin and a few granular casts. The serum bilirubin rose to 8.2 mg. per 100 ml. two days later and to 12 mg. after one week. By December 1 it had fallen to 1 mg. per 100 ml. and by December 29 to 0.8 mg. Thymol turbidity, which lay between 14 and 10 units in the first week, fell steadily to 4.5 units on December 29. Urobilinogen and urobilin (Ehrlich and Schlesinger tests respectively) were present in quantity for the first time on November 1. The haemoglobin was 110% on November 3. On December 5 total proteins were 8 g. % (albumin 6 g., globin 2 g.).

Paper Chromatography

At the height of coma (October 18) a specimen of urine was sent to Dr. C. E. Dent through the kindness of Dr. S. P. V. Sherlock. It showed a slight generalized amino-aciduria with abnormal quantities of cystine, lysine,