When non-lethal head injury is combined with other major but non-lethal injuries death may readily occur from cerebral fat embolism and other causes. Alleviation of the head injury by means of a suitable crash helmet may be expected to save life in some cases of this type.

The most effective method of preventing head injuries in motor-cyclists is careful driving. In addition the use of a crash helmet is advocated.

Seven accidents to motor-cyclists wearing crash helmets are reported. In all of them the head injury was mild, though in four there had been considerable damage to the crash helmet.

The incidence of fractures of the lower limb is greater in motor-cycle accidents than in other types of accident, and the number requiring prolonged treatment may be expected to increase when fatalities are averted by the use of a suitable crash helmet.

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A CASE OF CONGENITAL BILATERAL RENAL HYPOPLASIA WITH A SHORT REVIEW OF THE LITERATURE

BY

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Numerous cases of unilateral renal hypoplasia compatible with adult life have been described, but no case of bilateral renal hypoplasia in which the subject survived to adult age seems to have been reported. Indeed, very little mention of the condition has been made by observers in the past. Herbst and Apfelbach (1935), referring to this subject, state:

"Hypoplasia of the kidney was known to Blasius in 1677. Ballowitz (1895) assembled 20 cases, Risel (1903) 36 cases. Since that time many cases have been added to the literature, some of which are definitely hypoplastic, whereas others should be classified as acquired atrophy or one of the other forms of congenital anomaly. . . . According to Papin, hypoplastic kidneys are more frequently found in men than in women, and the right side is more often affected. It has been found in all ages, from the foetus to advanced life. In the living it is always unilateral, since if bilateral it could not sustain life. It may lie in a normal position or may be ectopic. The renal pelvis is usually small and frequently cone-shaped with small calices, some of which may be rudimentary in type."

Marion (1939) stated that congenital hypoplasia of the kidneys can be found on both sides, but he does not dilate further on the condition, merely stating that he had never seen a case.

Eisendrath (1935) has recorded 17 cases of unilateral hypoplasia, and Johnson and Wayman (1936) 8 cases. Eisendrath makes the following points in the diagnosis of the condition:

1. Intravenous pyelography may indicate the extent of the renal parenchyma.
2. Retrograde pyelography may show: (a) a triangular or ampullary pelvis, with minor calices arising direct from the pelvis proper without intermediary major calices; (b) the presence of only one or two calices arising from a very small pelvis.
3. Cystoscopy is of little value. A rudimentary or occluded ureter may be found.
4. The presence of a small kidney shadow.

In describing the developmental anomalies of the kidneys, of which hypoplasia is one, it is necessary to distinguish carefully between the various conditions which have been described. Mayers (1940), in a classification of renal anomalies, recognizes the following developmental abnormalities:

Congenital Hyperplasia.—Increase in size or number of cellular units—for instance, long kidney, large kidney.

Congenital Hypoplasia.—A macroscopically recognizable kidney—for example, infantile kidney.

Congenital Aplasia.—Hypoplasia to a degree which is not recognizable macroscopically, but of which there is histological evidence.

Congenital Agenesis.—Complete absence of development, therefore no evidence of renal tissue. This may be either bilateral or unilateral (congenital solitary kidney).

A definition of the pathological picture of congenital hypoplasia is given by Johnson and Wayman (1936) as "an abnormally small kidney with fewer glomeruli than normal. These glomeruli are less closely packed together and are often larger than normal."

In connexion with aplasia and agenesis a rigid distinction between these two conditions has not always been made in the literature. Hinman (1940) states that congenital bilateral absence of the kidneys has been recorded 135 times since 1663. He goes on to say that proved bilateral agenesis—i.e., true non-formation rather than secondary atrophy—is even less frequent, for only recently has microscopical examination been carried out to ascertain the presence or absence of atrophied remnants of the metanephros. The majority of these cases of renal agenesis were associated with gross malformations of the other organs.

With regard to the frequency of these conditions, Soloway (1939) states that unilateral renal agenesis is found once in about a thousand necropsies, while bilateral renal agenesis occurs once in about six thousand necropsies. As indicated above, unilateral renal hypoplasia is relatively common, while bilateral renal hypoplasia is, unlike bilateral renal agenesis, almost unknown. The aetiology of these conditions is not known. Hinman (1940) believes that they are all due to developmental arrest, and that the ultimate stage reached (whether agenesis, aplasia, or hypoplasia) is one only of degree. He also admits the rare possibility of an inherent defect in the germ plasm. The following is a report of our case.

Case History

The patient, a man aged 22, a compositor in civil life, had joined the Army on September 23, 1940. He had always enjoyed good health until his present illness. His mother and father, aged 45 and 50 respectively, are alive and well and have never had any serious illness. There is no family history of any renal disease. The mother is said to have received sanatorium treatment many years ago. There is one sister, aged 20, who had infantile paralysis at 2 years of age, which resulted in weakness in the right leg. There is no history of miscarriages or stillbirths in the family. Both grandfathers of the patient are dead, the cause of death not being known. Both grandmothers are alive and well. The patient has never had rheumatic or scarlet fever; the tonsils were removed during childhood, but there is no record of any renal complications. The patient has never previously suffered from any urinary disturbance such as oliguria or frequency.

On October 8, 1940, he had a shivering attack and headache. His nose felt "stuffy" and the throat dry. No actual cold developed, but there was a slight dry cough. After a few days he produced some white sputum. The shivering disappeared, and about five days later he started vomiting, the attack lasting four days. He had no appetite, and on October 18 was slightly jaundiced. The vision became blurred on one occasion. On October 21 he reported sick and was admitted to an E.M.S. hospital.

On examination he looked ill, he was very drowsy, the tongue was dry, and the conjunctivae were slightly jaundiced. The temperature was normal and the pulse 52. There were no abnormal signs in the heart or lungs. The blood pressure was 130/85. The blood urea was 356 mg. per 100 c.cm., the red cells numbered 3,610,000 per c.mm., and the haemoglobin was 70%. The urine contained albumin ++, but no casts or red cells were seen.

The patient was transferred to our hospital on October 23 with a diagnosis of uraemia, and he remained there until his discharge on April 27, 1941. On admission the tongue was furred but moist, and he was somewhat drowsy, but his general condition was good. The cardiovascular system showed no abnormality and the blood pressure was 130/80. The optic disks were normal, with large physiological cups and a tigroid fundus background. The urine, specific gravity 1020, contained albumin ++, sugar nil, red blood cells +, pus cells +, a few crystals of uric acid, and no organisms. The blood urea on October 28 was 300 mg. per 100 c.cm. The van den Bergh reaction was within normal limits.

SUBSEQUENT PROGRESS

The patient was kept in bed on a low-protein diet. The output of urine was at first small, but after two to three weeks it increased considerably in volume. By December 2 he felt his normal self again, having made steady progress. The blood urea had fallen progressively, and was 200 mg. per 100 c.cm. on December 2. He was then passing large quantities of pale urine of low specific gravity, containing from 0.15 to 0.20 grammes of albumin per 100 c.cm., estimated by Esbach's method. At this point he was allowed up, and he felt very well. The diet had meanwhile been slightly increased in protein. The blood pressure was 124/86. The blood urea on one occasion was 117 mg. per 100 c.cm., but it would not drop any lower. The urine contained granular casts on occasion. On November 9 intravenous pyelography was carried out, but there was no excretion of dye up to forty minutes.

On December 25 the blood urea was still high, and in a further effort to lower it he was confined to bed for two months. During this period the blood urea never fell below 101 mg. per 100 c.cm., and mostly fluctuated between 130 and 160 mg. In view of the failure of this treatment and his continued good health he was allowed up, and a month later was sent on leave. Immediately after his return to hospital, on April 10, 1941, the blood urea was 130 mg. per 100 c.cm. He continued to keep reasonably well, although he was easily fatigued and not fit for more than light work. There was still moderate albuminuria, and his condition had changed but little during the past four months. He was discharged from the Army, and on April 27 he left hospital to take up his civilian occupation. The blood pressure was then 130/82, and at no time was there any evidence of cardiovascular hypertrophy.

While in hospital the following additional laboratory findings were obtained:

Urea clearance: 9% average maximum normal on November 5, 1940; 4.8% average maximum normal on February 26, 1941.
Plasma CO₂, 29 volumes per 100 c.cm. on November 5, 1940.
Plasma proteins, 6.6%.
Blood cholesterol, 194 mg. per 100 c.cm.
Serum calcium, 8.4 mg. per 100 c.cm.
Serum phosphorus, 4.9 mg. per 100 c.cm.
Blood phosphatase, 15 units per 100 c.cm. on March 20, 1941.

X-ray Findings.—As mentioned above, intravenous pyelography on November 9 revealed no excretion of dye up to forty minutes. When repeated on January 20, 1941, it gave the same result. Retrograde pyelography of the left renal tract on February 15 and of the right side on March 20 clearly showed the renal shadows, and both were abnormally small. It is regretted that owing to paper shortage it has not been possible to reproduce

the original films. The accompanying diagrams, however, indicate the state of affairs. The normal kidney lies between the level of the upper border of the twelfth thoracic vertebra and the third lumbar vertebra, the right kidney being slightly lower than the left (Fig. 1). In the films the right kidney shadow

FIG. 1.—Outline diagram from a radiograph taken after retrograde pyelography in a normal healthy young adult.

FIG. 2.—Outline diagram from a radiograph taken after retrograde pyelography in our patient, showing features referred to in the text.

extends from the middle of the first to the lower border of the second lumbar vertebra, and the left kidney shadow extends from the lower border of the twelfth thoracic vertebra to the lower border of the second lumbar vertebra (Fig. 2). The kidneys are therefore normal in relative position, but each is only about half the normal size. The right renal calices are only two in number, and are flattened and deformed. The right renal pelvis is small. The left renal calices are three in number, but are flattened and deformed also. The left renal pelvis is fairly normal in appearance. The course and appearance of the ureters are within normal limits.

Cystoscopy showed that the bladder and the ureteric orifices were normal, as were the external genitalia, and there was no evidence of any other congenital anomalies.

Discussion

Although we were not in a position to carry out a post-mortem examination the following points enabled us to make a diagnosis of bilateral congenital hypoplasia of the kidneys:

1. The sudden onset of uraemia in a young adult without a previous history of renal disease is a feature of the case. Such a history is also characteristic in polycystic kidney, which is the only other bilateral congenital renal insufficiency known. This lends considerable support to the conclusion that the lesion is congenital.

2. The x-ray findings conform to the conditions laid down by Eisendrath (1935), quoted above, in the following particulars: (a) The kidney shadows are small. (b) There is a decrease in the size of the renal pelvis, with only two major calices on the right side. Flattening and deformity of the calices are present on both sides.

3. The absence of cardiovascular hypertrophy favours a congenital rather than an acquired lesion. According to Oppenheimer (1934) hypertension is found in only 57% of cases of polycystic kidneys. In chronic interstitial nephritis, with the so-called secondary contracted kidneys, it is exceedingly rare not to find hypertension.

The alternative diagnosis of chronic interstitial nephritis may be ruled out in view of the absence of any history of previous nephritis, the presence of definite x-ray evidence of deformed renal calices and pelvis, and the absence of any cardiovascular hypertrophy.

It has been stated by Herbst and Apfelbach (1935) that bilateral hypoplastic kidneys are incompatible with life.

The question whether this is so or not depends entirely on the number of functional glomeruli present in the hypoplastic kidneys. The normal kidney has an enormous reserve, and kidneys which possess at least a minimum number of functional glomeruli will certainly be compatible with life, just as the grossly damaged kidneys of polycystic disease or of Bright's disease may be able to support life for a number of years.

Among the other remarkable features of this case is the maintenance of reasonably good health with grossly inefficient kidneys. This suggests that a tolerance has been established to a high non-protein nitrogen in the blood over a number of years. It may here be remarked that this is good evidence that hypertension is more unfavourable to the patient with Bright's disease than is the glomerulotubular damage. Other points to be noted are the absence of any sign of renal infection and the relatively unchanged blood chemistry, apart from the blood urea. The latter findings also support the conclusion that the condition in this case is a congenital one.

Summary

A review of the literature on congenital developmental anomalies of the kidneys is given, with particular reference to hypoplasia, aplasia, and agenesis.

A case of congenital bilateral renal hypoplasia is described; this is believed to be the first one recorded in the literature.

Certain unusual aspects of the case, and the differential diagnosis, are discussed. Comparison is made with congenital polycystic kidneys, to which the condition bears considerable clinical resemblance. It is recorded that bilateral congenital hypoplasia of the kidneys is compatible with a reasonably healthy adult life.

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A REVIEW OF DYSPESIA IN THE ARMY

BY

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The present paper is a report on the dyspepsia in a military hospital during the year 1940. This hospital is situated in an area in which all types of troops are represented. During 1940, 8,702 medical cases were seen either as in-patients or out-patients; of these, 1,270 (14.6%) were diagnosed as disorders of the stomach or duodenum. I have collected the notes of 804 cases which were under my care, either in the gastric unit or as out-patients, during the first fifteen months of the war (October, 1939, to December, 1940). There were 420 out-patients and 384 in-patients, this latter figure referring only to cases admitted since April, 1940, when a gastric unit of fifty beds was formed. This unit was instituted so that uniformity in diagnosis and disposal could be achieved; and although the problems of administration, of dieting, and of investigations were simplified, there were great disadvantages in having these patients in a single ward together. Of the 804 cases 91 were Canadian, 6 New Zealand, and 707 (31 officers, 143 N.C.O.s, and 533 other ranks) British. There were only a few patients from the Dominions, because they operated their own hospitals.

The diagnosis may be summarized as follows. Dyspepsia of all types, 804 cases: gastro-duodenal dyspepsia, 742 (92.3%); peptic ulceration, 424 (52.7%).

During the early months of the war dyspepsia of all types was most commonly found in Reservists, but it has now been observed to be equally prevalent among men called up in the "Army classes." The numbers naturally varied with the class of troops in the area at the time. However, dyspepsia does seem to be rare in Regulars. Although occupation was recorded in over half the cases it was of no great value because of the difficulty of classifying the results. In the majority the duration of symptoms was between two and five years. In only 10% did symptoms originate during service in the Army, and of these 80 patients 13 were neurotic in character. It is noteworthy that of the 91 Canadian patients 47 developed symptoms only after arrival in this country.

In order to make a diagnosis it is of the utmost importance that an accurate and detailed history taken in chronological sequence should be compiled. Of the special investigations radiographs were most valuable. The fractional test meal was of only partial value, as it was found that with patients who had experienced difficulty in swallowing the tube abnormal curves were recorded. The most extraordinary curves were obtained when an air-raid warning had been sounded during the test.

Table showing Details of Results

British				
	Radiograph +	Radiograph -	No Radiograph	Totals
Ulcers:				
Duodenal ulcer ..	218	9	55	282
Gastric ulcer ..	45	3	19	67
Pyloric ulcer ..	36			36
Jejunal ulcer ..	6			6
Gastro-duodenal dyspepsia:				
Pylorospasm ..	47			47
Irritable stomach ..	27			27
Hyperchlorhydria ..		32		32
Achlorhydria ..		14		14
Gastritis and duodenitis ..	15	82	35	132
Carcinoma pylori ..	1			1
Duodenal diverticulum ..	1			1
Reflex dyspepsia:				
Neurotic dyspepsia ..		11	29	40
Pulmonary Tb. ..	5			5
Ch. appendix ..	9			9
Colonic dyspepsia ..	5			5
Cholecystitis ..	3			3

Dominion Cases

Ulcers:				
Duodenal ulcer ..	30			30
Gastric ulcer ..	3			3
Gastro-duodenal dyspepsia:				
Cardiospasm ..	1			1
Pylorospasm ..	3			3
Hyperchlorhydria ..	14			14
Achlorhydria ..	3			3
Gastritis or duodenitis ..		15		15
Transferred (no diagnosis*)				28

* These cases were transferred to E.M.S. hospitals before a definite diagnosis was made. The majority had the hyperchlorhydria type of dyspepsia.

Peptic Ulcer

In the British series there were 391 (55%) patients with definite evidence of peptic ulceration—a high figure, but one which would have been higher if it had been possible to make allowances for "missed ulcer" cases.

Age.—The ages at which symptoms were first noticed by the patients are recorded in the accompanying graph. It will be seen that the highest incidence for duodenal ulcer is between 20 and 30, and that the same is true of gastric ulcer, although the curve is flatter.