Most authorities are agreed that operation is rarely indicated in cases of spinal injury with complete transverse lesion of the cord, unless the injury is below the first lumbar vertebra. One would not go so far as to extend this limit upwards by a vertebra, as a general rule, on the strength of the case described; for although early and complete reduction was obtained, the patient is still, and is likely to remain, very much of an invalid; inasmuch as a return of sphincteric control is not to be expected. The presence of cystitis, moreover, which persists to some degree in spite of treatment, is a constant menace to the integrity of his kidneys. Nevertheless, the measure of recovery which has taken place is very encouraging. It is largely to be attributed to the optimistic outlook of the patient, and the skill with which he has been nursed.

The chief point of interest is the extreme rarity of such a lesion. Dislocations of the spine without fracture occur almost entirely in the cervical region—about 98 per cent. The remainder occur in the dorsal region. I have not been able to find any previous record of a dorso-lumbar dislocation.

I am indebted to Dr. A. Rayner, honorary radiologist to the Infirmary, for the excellent radiographs.

A CASE OF SUPRARENAL TUMOUR, WITH DEGENERATION OF THE RETICULO-ENDOTHELIAL SYSTEM.

(With Special Plate.)

BY

J. GRAHAM WILLMORE, AND MACKENZIE DOUGLAS,
M.D., M.R.C.P., M.A., M.D.

In a leading article in the *BRITISH MEDICAL JOURNAL* of September 20th, 1924, the question is raised as to what might occur in the event of damage to the cells of the reticulo-endothelial system. Comment is made as to the lack of clinical evidence on this subject, and the need for further investigation regarding the effects on digestion and metabolism of a diminished formation of bile.

A case recently under the care of one of us may possibly supply the answers to at least some of the problems thus postulated, and we think that a fairly full report of it may be of scientific interest.

X. Y. Z., aged 31, first seen on April 22nd, 1924, complained of diarrhoea and vomiting. The date of onset was uncertain, but probably not earlier than July, 1923. He had served in France, Salonika, and with the Egyptian Expeditionary Force from 1915 to 1919. He had "enteric" in 1916, but no other serious illness. Family history unimportant. Height 5 ft. 5½ in.; weight 8 st. 4 lb. 4 oz. On admission he was pale, and his general condition poor. His tongue was raw and red, with (later) small, sore, sprue-like ulcers on its right lateral surface near the tip. The teeth were in order. There was no pigmentation of skin, and no icterus. The central nervous system was normal, but he stammered.

The abdomen was distended, tympanitic, and rigid. There was tenderness in the right hypochondrium, where the patient complained of constant severe pain during the whole of his illness. No mass was palpable (confirmed by several observers).

The liver was diminished in size (percussion and x rays). No abnormality was detected in the spleen, heart, or lungs.

The urine was acid; specific gravity 1010; there was a faint trace of albumin; no sugar. (N.B.—Glycosuria had been found previous to admission.) No acetone or diacetic acid was present. Diastase: 24 - $\frac{1}{2}$ = 20 units—that is, within normal limits. Microscopically, hyaline casts and polymorphonuclear cells were found. Cammidge's reaction was positive.

The blood Wassermann reaction was negative on repeated examination, both before and after provocative neosalvarsan. Blood pressure 190/130. A blood count showed: red cells 5,530,000; haemoglobin 80 per cent.; colour index 0.7; white cells 15,500—polymorphonuclears 64 per cent., eosinophils 1 per cent., large mononuclears 4 per cent., lymphocytes 31 per cent.; no abnormal cells were present. (On August 8th the red cells numbered 6,000,000; haemoglobin 80 per cent.; white cells 22,700—polymorphonuclears 70 per cent., eosinophils 1 per cent., large mononuclears 9 per cent., lymphocytes 20 per cent.) Urea, 0.015 per cent.; cholesterol, 0.145 per cent. Van den Bergh's test showed no direct reaction, but a very weak positive indirect (mere trace).

Blood sugar:

(a) 9.30 a.m. (fasting) 0.081 per cent.	
(9.35 " 50 grams of glucose per os.)	
10.5 " 0.156 per cent.	(Urine, 0)
10.35 " 0.205 " " " " "	(" 2 per cent.)
11.5 " 0.187 " " " " "	(" 1.51 ")
11.35 " 0.175 " " " " "	(" 0)

(b) 10.27 a.m. (fasting) 0.118 per cent.	
(10.30 " 50 grams of laevulose per os.)	
11.0 " 0.150 per cent.	(Urine, 0)
11.30 " 0.143 " " " " "	(" 0)
12 noon 0.131 " " " " "	(" 0)
12.30 p.m. 0.085 " " " " "	(" 0)

The faeces were abundant, pultaceous, light clay coloured, fermenting, and offensive; they were completely acholic by chemical examination.

Neutral fat	16.8 per cent.	=25.5 per cent. of all fat
Fatty acid	38.5 " "	=58.6 " "
Soaps	10.5 " "	=15.9 " "

Total ... 65.8 per cent.

N.B.—Total should not exceed 22.5 per cent.

Microscopically, muscle fibres, oil globules, and fatty acid crystals were found in the faeces. There were no protozoa, cellular exudate, blood, or mucus; no tubercle bacilli were found. The benzidine test showed no occult blood (on meat-free diet).

Sigmoidoscopy revealed no abnormality.

The fractional analysis of a test breakfast (oatmeal gruel) revealed no free hydrochloric acid, and a total acidity not exceeding 0.018 per cent. During an attack of vomiting, however, on May 15th, the vomitus showed 4.9 per cent. of lactic acid, with no free hydrochloric acid. An opaque meal revealed a high active stomach, with a normally acting intestine, empty in twenty-four hours.

No gall stones were found on a special examination. Loewi's mydriasis test was negative. The temperature was afebrile, and the pulse between 74 and 96.

On the presumption that the illness might be due to sprue of an unusual type, the patient was put to bed on a sprue diet (fat-free) and given calcium lactate gr. xx t.d.s. and parathyroid gr. 1/10 t.d.s. The only effect of this was to convert the diarrhoea into a most obstinate constipation—not relieved by *fel bovin.* gr. xv t.d.s.—which lasted until the patient's death, long after the sprue treatment had been discontinued. At no time (except when bile was being administered) did the stools show a trace of bile in any form, at no time was there any evidence of jaundice in skin, conjunctivae, or blood serum, nor did the urine show a sign of bile pigments or salts. On the supposition that the case might be due to syphilis a course of intravenous neosalvarsan (two injections of 0.15 gram at weekly intervals) was begun; but this provoked such intense headache, with albuminuria up to 1.7 grams per litre, that it was abandoned.

The patient's progress thereafter was steadily downhill, the liver began to increase in size, and his weight fell to 7 st. 10 lb. 8 oz. On August 8th he developed a lobar pneumonia which was practically afebrile throughout, the temperature rising to 100° F. during three days of the first week only. The respirations, on the other hand, rose to 56 and the pulse to 120. He died on September 2nd.

Post-mortem Examination.

At the autopsy, sixteen hours after death, *post-mortem* rigidity was present. The body was emaciated. There was no sign of jaundice in the skin.

Thorax.—There were no adhesions and no fluid in either pleura. The lining of the trachea and large bronchi was hyperaemic, and there was much viscid muco-purulent material. There was consolidation of both lobes of the left lung and of part of the lower lobe of the right lung. There was no sign of tuberculosis and no new growth. The heart weighed 13½ oz. There was some hypertrophy of the muscle walls, which were soft. There was no change in the valves. There was no atheroma of the coronary arteries. There was some fatty change in the first part of the aorta.

Abdomen.—The stomach and duodenum showed no change of note. In the small and large intestines there were patches of hyperaemia but no other change of note. There was no evidence of dysentery. The pancreas, which weighed 1½ oz., showed no naked-eye change. Attached to the tail by adhesions was a tumour about the size of a man's fist. This tumour, lying above the upper pole of the left kidney, was attached by adhesions to the spleen and to the transverse colon. The spleen was very firmly attached, and could only be separated by tearing away some of the splenic tissue. The left suprarenal could be definitely seen to be embedded in the tumour, characteristic suprarenal tissue being seen at the lower portion of the tumour. On the surface the tumour was nodular and on section it had a patchy yellow and dark red appearance with many cysts, some of which had well marked fibrous walls. The largest cyst was about 2½ inches in diameter. Most of the cysts contained a dark brown "colloid" material, but the contents of the large cyst were of a slightly more fluid consistence. The right suprarenal showed no new growth or change of note. Along the left suprarenal vein were small new growths similar in appearance to the large one, but not cystic. The vein was greatly dilated and one of the growths with a diameter of three-eighths of an inch had budded into the vein and was attached to the intima. It did not occlude it, however. The kidneys showed little change of note to the naked eye, except slight enlargement of the left. The capsules stripped readily. There were no new growths in either. The right weighed 5½ oz. and the left 7¼ oz. The liver was slightly enlarged. It weighed 3 lb. 13 oz. The change in appearance was very striking, looking like a very marked "nutmeg liver," the dark patches contrasting very markedly with the light fatty portions. There were no new growths present in the liver, and there was no indication of any abscess and no scarring. The gall bladder contained a little yellowish mucus.

Microscopic examination of the tumour showed at one portion the normal cortical portion of the suprarenal with practically no medulla; the tumour seemed to grow from one portion of the zona fasciculata, the cells near the suprarenal being in long pillars with increased fibrous tissue between the different acini. The cells had the appearance of polygonal epithelial cells, like liver cells,

characteristic of the middle zone of the suprarenal cortex. Further away the cells were arranged in round masses separated in places by a delicate stroma and wide capillaries filled with red blood corpuscles. At other parts of the tumour there was much fibrous tissue, and at places the tumour was undergoing mucoid degeneration with disappearance of the alveoli; at places it would appear that the cystic appearance was due to these degenerated areas surrounded by the thick fibrous tissue with haemorrhages. At one point there was much pigmentation and fibrous tissue as from an old haemorrhage. The bud growing in the vein showed round masses of cells similar to those in the large tumour. There was not much interstitial fibrous tissue in this growth, but the cell masses were separated by capillaries which were congested. Mitotic figures were not frequent and seemed to be fairly regular. The nuclei of most of the tumour cells contained well marked round nucleoli. (See Figs. 1 and 2 on Special Plate.)

The suprarenal of the right side showed microscopically little change of note.

The pancreas from the portion adjacent to the tumour showed the islets of Langerhans slightly disintegrated, the strand-like appearance of the cells being lost and the protoplasm of the cells diminished. There was little change in the nuclei of the cells and the alveoli of the pancreas were fairly well preserved. There was no invasion of the organ with new growth.

The spleen showed some fibrosis, and at places, especially where it was adjacent to the tumour, there was necrosis. At other places the organ looked oedematous and to have lost the arrangement of pulp sinuses.

The liver showed very advanced fatty change. In a paraffin section there were places where the appearance was that of adipose tissue with the large clear spaces from which the fat droplets had been dissolved. There was very little protoplasm left in some cells, but the cell nuclei showed up well. The reticulo-endothelial system seemed to be quite obliterated. This was the appearance of the peripheral and middle zone of the lobules. Round the central venule the degeneration was even more marked. There were no liver cells intact. There were only red cells, polymorphs, some nuclei, and dark brown pigment globules. The pigment did not give a blue reaction with potassium ferrocyanide and hydro-

chloric acid, but remained dark brown. Frozen sections stained with haematoxylin and Scharlach R showed the adipose appearance very markedly, the large fat droplets quite obliterating the protoplasm of the liver cells, while round the central veins were the red cells and dark brown pigment granules. Sections stained by Langhans's method showed complete absence of glycogen.

The two remarkable findings at the autopsy were: (1) The occurrence of a true tumour of the suprarenal in contradistinction to the hypernephromata which are usually found to arise in the kidney. Budding of the tumour occurred to a slight degree in the neighbourhood of the tumour, but there were no metastases. (2) The fatty changes in the liver and the central degeneration of the lobules were as marked as those after chloroform poisoning, and greater than in any other condition in our experience.

Conclusions.

The clinical condition of the patient, the constant pain in the right hypochondrium—which at times was so severe as to suggest biliary colic—and the nature of the stools, all pointed to the liver being the primary seat of the disease; the site and comparatively small size of the tumour, the rigidity of the distended abdominal walls, and the fact that the patient never complained of pain or tenderness on the left side, all combined to mask the presence of the tumour.

We hazard the suggestion that from the first some poison must have been at work—possibly one secreted by the neoplasm—with a special selective action upon the hepatic parenchyma, and, to a less degree, on the spleen. The result of this was that the hepatic functions were almost suspended, the carbohydrate metabolism was disturbed, and possibly the haemolytic functions of the spleen were moderated; otherwise one would have expected at least some secondary anaemia in a man profoundly ill and cachectic for so long a period before his death.

PERFORATION OF THE KIDNEY BY A LARGE BRANCHED CALCULUS.

PERINEPHRIC ABSCESS: SEPTICAEMIA: DEATH.

(With Special Plate.)

BY

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It is well known that a large stone may rest in the kidney pelvis for many years with an almost total absence of any symptoms. The following case illustrates this very well, and I think it worthy of recording because of the unusual size of a branched phosphatic stone removed from the right kidney and of the clearly defined and interesting conditions found at the operation.

History.

Mrs. K. M., aged 60, was admitted to hospital on September 26th, 1924, complaining of great pain across the back and over the right lumbar and hypogastric regions, accompanied by vomiting and diarrhoea. She stated that until six days previous to her admission she had been a very healthy woman, with hardly a day's illness in her life of sixty years. She had, however, suffered from time to time from bouts of flatulence, and when this occurred she had a dull aching pain in the back which disappeared after getting rid of the flatulence. A point, to which I at first did not pay much attention, but which might have an important bearing upon her illness, was that six weeks previous to the commencement of her illness she complained of a severe pain in her back after lifting a heavy bucket of water. On September 20th, she complained of general backache on getting up in the morning, which later in the day became more severe and settled down to the right of the spine. She felt ill and that night had a rigor and vomited. Vomiting occurred several times daily from the commencement of her illness. On the third day she complained of the pain spreading round to the front of the abdomen on the right side. On the fifth day she again had a rigor and diarrhoea began. The pain remained severe and gave her no rest that night. She called in Dr. Irving of Barry on the morning of the sixth day, who advised her removal to hospital. Careful investigation of her past life revealed no history of any haematuria, no colic or radiating pains, no frequency of micturition, and her water as far as she knew had always been clear. As stated above, there had been occasional dull lumbar pain associated with flatulence.

Examination.

The face was flushed, with marked pallor round the mouth, the tongue was furred and dry, and the breath was foul. Her temperature was 99.8°, the pulse 128 and of little volume. Her picture was that of general toxæmia. She was a big, well built woman. On examination of the abdomen there was a visible swelling of the right hypogastrium. On palpation a rounded, tender swelling the size of a large coco-nut, dull to percussion, could be felt filling the right hypogastrium, extending forward to the middle line and down into the right iliac fossa as far as the middle of Poupart's ligament, but here its lower border was ill

defined and the fingers could not get below the tumour. The swelling could be pushed forward slightly with a hand placed posteriorly. In the absence of urinary symptoms the diagnosis was obscure, although it was thought that the swelling was renal in origin. The urine showed only a trace of pus, with no sign of blood.

Operation.

A general anaesthetic was administered by Dr. Neilson of Barry, and the abdomen opened in the region of the right semi-lunar line. Examination revealed a large kidney, bigger than a coco-nut, with a boggy fluctuating swelling below its lower pole extending to the brim of the pelvis. The peritoneum was again drawn together and was peeled off the anterior surface of the kidney, the ascending colon and caecum being displaced inwards and packed off with towels. A large, very foul abscess, smelling of *B. coli*, and of the consistency of thick cream, was opened into. There was oedema and induration of the surrounding cellular tissue and fat. The abscess, which was outside the fatty capsule of the kidney, and which extended inwards and downwards to the brim of the pelvis, was first of all swabbed up. The fatty capsule was greatly indurated, and on piercing it with the finger several ounces of urine and thin pus were evacuated. On palpating the enormous kidney, a hard body, presumably stone, could be felt in the upper pole. At the lower pole the finger encountered a soft necrotic area, about the size of a florin, through which a stone could easily be felt. The kidney was so indurated that the body of the large stone which was subsequently removed was not felt on palpation. In view of the critical condition of the patient, and of the superadded difficulties that would be met in removing such a kidney, it was decided to remove the stone by splitting the kidney in its long axis. Although it was found impossible to put a clamp upon the pedicle without grave danger to the major vessels, because of the matting and induration of the fat in the hilum, the kidney did not bleed much on section. The kidney substance was very indurated and grasped the stone firmly. Three of the dendritic processes broke from the body, and one was removed through the perforation in the lower pole. After extraction of the fragments the kidney was sutured in the usual manner. Ample drainage was provided, and intravenous and subcutaneous salines were administered before the patient left the theatre. She came out of her shock, but died on the evening of the third day following the operation, from septicaemia. A post-mortem examination was not obtained.

Pathology.

The accompanying sketch illustrates the interesting conditions found at the operation and suggests the pathological sequence. (1) Stone formation. (2) Infection and necrosis of kidney substance