injected, block the vein above the needle with my left thumb, and inject slowly into the vein. The syringe is then removed, and the blood prevented from flowing out of the needle by placing a finger on the mount. The needle is left *in situ* for about one minute, or until no blood flows out of it. The left thumb is removed at the same time as the needle is withdrawn. During the operation the patient is seated at a convenient height. By this method the fluid is prevented from getting into the cellular tissues. In one case, where some 30 per cent. solution of sodium salicylate got into the cellular tissues, a cellulitis was produced and a slough formed at the site of injection. As the tissues over a varicose vein are very thin and their vitality greatly reduced, this is liable to happen unless great care is taken to ensure that no fluid escapes into the subcutaneous tissues. Where a varicose ulcer or eczema is present the effect of the injection is sometimes very marked.

In no circumstances would I recommend the injecting of an inflamed vein. In my opinion, before treatment is begun a considerable period should elapse after inflammation has been present, both on account of the danger of producing a recrudescence of the inflammation and subsequently septic emboli, and also, in some cases, after phlebitis it is found that a cure has resulted.

I do not claim that the results of injecting varicose veins are better than those obtained by operation, or that the liability to return of the varicose condition is less (in fact, I would expect the percentage of recurrences to be higher); but I do claim that the treatment improves the circulation in the legs, and consequently the strength of the lower extremities, without incapacitating the patient in any way.

REFERENCE.

¹ *Journ. de Thérap. Franç.*

DORSO-LUMBAR DISLOCATION OF THE SPINE REDUCED BY OPERATION.

(With Special Plate.)

BY

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THE occurrence of spinal dislocation without fracture is extremely rare below the cervical region. The case to be described was practically a pure dislocation of the twelfth dorsal from the first lumbar vertebra.

Walter R., aged 25, motor driver, was admitted on February 4th, 1924, to the Royal Infirmary, Preston, suffering from shock and paraplegia. The following history was obtained: When driving a heavy vehicle from Ormskirk to Preston, the same evening, he had stopped just round a right-angled bend in the road, and got underneath the car, taking the rear light with him, to inspect and repair a leaking petrol pipe. Another vehicle ran into the stationary car from behind, and knocked it forwards a few yards; one of the wheels passed over R.'s body.

On admission the patient was conscious and in a state of severe shock. There were numerous abrasions of skin over the chest and upper abdomen, especially on the right side. Both lower extremities were completely without power of movement; knee- and ankle-jerks were absent. There was no sensation in the right foot and reduced sensation in the other parts of the lower limbs. The patient complained of great pain in the back and at the right side of the chest; respiration was difficult. Subconjunctival haemorrhage was present in both eyes. There was swelling and loss of alignment of spinous processes at the dorso-lumbar region, without undue prominence of any particular spinous process. Sphincteric control was lost. The abdomen was soft, and resonant in the flanks. The tenth right rib was fractured.

X-ray examination on February 5th showed a lateral dislocation of the twelfth dorsal from the first lumbar vertebra, with displacement of the lower portion of the spine to the right. Apart from a small chip of bone detached from the left upper margin of the first lumbar body, the injury was a pure dislocation (see Fig. 1).

An attempt at reduction under anaesthesia on February 6th by traction, etc., was unsuccessful.

On February 7th, assisted by my colleague Mr. A. Toulmin, I exposed the injured part by a median dorsal incision, with the patient in the prone position. The articular processes were intact; the left lower articular process of the twelfth dorsal vertebra was placed externally to the left upper process of the first lumbar, thus opposing reduction. Laminectomy of the first lumbar was performed, but this did not help matters much, except to give a better view of the spinal cord, which was seen passing obliquely in a strap-like manner between the displaced vertebrae. The spine was then flexed at the injured part by raising the lumbar bridge of the

operating table. This disengaged the articular processes; by lateral pressure they were forced into correct alignment and the spine was then allowed to extend by letting the bridge down. The articular processes thereupon fell into their correct positions, and as they were intact there was no tendency to recurrence of the displacement (see Fig. 2). The dural sheath of the cord appeared to be uninjured. Muscles and fasciae were united as well as possible; a small drain was placed at the lower end of the wound.

After operation the patient was kept on his back, with a pillow under the injured part of the spine. There was complaint of pain and "pins and needles" in the legs for two days. Cystitis was present, the urine being alkaline and containing blood and pus. Regular catheterization was necessary.

On February 11th very slight active movements were elicited at the left great toe. Tested on February 21st, most of the muscles of both lower limbs were found to respond to faradism, the responses being weaker on the right side than on the left. Within three weeks there were feeble active movements in the muscles of both limbs, above and below the knee. Under treatment by massage and electrical stimulation these gradually became stronger. Sensation was normal, except at the right sole, where it was diminished, and over the right great trochanter, where it was absent over a small area (see later). A small bed sore over the sacrum appeared, but soon healed.

By March 10th the cystitis, in spite of the usual remedies, was alarming; the urine was very foul, and the patient was running a temperature of 100° to 101° every evening. There was a small hard swelling above the pubic symphysis. On March 20th a supra-pubic incision was made and pus evacuated from an abscess behind the symphysis. A separation of the symphysis, wide enough to admit a finger, was found; this injury had hitherto escaped observation. The bladder was then opened and a tube inserted. Subsequently the patient's general condition improved markedly. The supra-pubic incision eventually closed, after which catheterization was again necessary. There were no signs of returning control over the anal sphincter. The patient was discharged, to attend as out-patient, on September 18th. He had been trying his legs, assisted by crutches, occasionally during the previous three or four weeks.

Present condition (October 28th): The general condition is fairly good, and the patient maintains a cheerful outlook, as indeed he has done ever since the accident. He eats well; his weight is 8 st. 6 lb. (normally 9 st. 10 lb.). The operation wounds are well healed. He can get about the house without the aid of a stick; outside he can walk about half a mile with two sticks. He takes an aperient every three days, otherwise his bowels do not act. Having taken the aperient, he prepares to be incontinent. He wears a catheter, leading into a portable urinal. The catheter is removed and replaced twice weekly.

In walking the right leg is thrown outwards, as slight foot-drop is present. The left leg is a sound and useful limb, with full range of movement, active and passive; but the knee-jerk is weak and the ankle-jerk not elicited. The right leg is considerably weaker—for example, when sitting in a chair the patient can only partially extend the knee with the foot off the ground. Full passive extension of the knee is obtained, but not full flexion. The ankle is somewhat stiff and cannot be dorsiflexed passively to less than a right angle. The anterior and posterior tibial muscles have active power, but are weak; toe movements are almost absent. The peronei exhibit very faint active movements. The anterior part of the foot is somewhat inverted, giving a slight degree of pes cavus. No knee- or ankle-jerk is elicited on the right side, and the whole limb feels cold to the touch as compared with the left. There is slight oedema at both ankles and feet, more marked on the right side. Sensation to light touch with cotton-wool and to pin-prick is present over both lower extremities, except at a small area, about 4 inches square, over and above the right great trochanter, extending almost to the iliac crest. This area is quite anaesthetic to touch and pain; no doubt it indicates a laceration of the twelfth dorsal nerve, whose lateral cutaneous branch supplies this area. Although present, sensation is diminished at the right sole. Plantar reflex is not obtained at the right foot; at the left the second to fifth toes extend slightly, and the great toe remains motionless.

The right thigh measures 2 inches less than the left in circumference at middle; the right calf is half an inch less than the left. Oedema of the right calf masks the wasting of muscles. The muscles of the left leg respond to faradism, including the intrinsic muscles of the foot. On the right side response is feeble and absent from the peronei and foot muscles.

The urine is alkaline and deposits pus and phosphates; specific gravity 1020; albumin present. Treatment is being continued. (There has been some improvement in the condition of the urine since this report was written, and it is hoped soon to dispense with the catheter.)

Comments.

The spinal cord being crushed at the lower part of the lumbar enlargement—where the centres for control of the bladder and rectum are situated—recovery of voluntary control of these was not to be expected. Most of the nerve fibres to the muscles of the lower extremities have left the cord above the level of the injury in question, and in this case they soon began to recover from the pressure to which they had been subjected. A laceration of the twelfth dorsal nerve, at its exit from the intervertebral foramen between the twelfth dorsal and first lumbar vertebrae, is readily conceivable, to account for the area of anaesthesia over the great trochanter on the right side.

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,