

into right carotid and right subclavian, marks the source of the fatal hemorrhage. In the tumour some layers of fibrin were observable. At the point where the acupressure was applied to the axillary artery the vessel was not completely occluded, but narrowed. The head and abdomen were not opened. From the examination of the parts, I arrived at the following conclusions:—Firstly, that the return of the pulsation in the tumour arose from the slipping of the artery from the jaws of the compressor, forming in consequence a small channel through the vessel beyond the extremities of the blades. Secondly, that by screwing the instrument tightly to arrest the current of blood, I made undue pressure on the anterior portion of the artery, and thus produced the slough. Thirdly, that an artery may be *acupressed* for several hours with perfect safety. Fourthly, that the blades of the compressor were too short, and not sufficiently curved for a vessel of this size. As to the compressor, I am convinced that it is really a good instrument, devised on a good principle, and I believe it will ultimately succeed in curing aneurism. If no slipping of the artery take place, a very slight amount of pressure is sufficient to arrest the current of blood; and I believe if I had merely passed an ordinary aneurism needle under the artery, and looped over the vessel with a piece of wire, the result would have been favourable. I cannot conclude without expressing my best thanks to my apprentice, Mr. E. J. Cooke, and the resident pupils of the hospital, Messrs. Lough and Crosslè, for the unwearied attention and assiduity they bestowed on the poor sufferer.

ART. XI.—*Reports of Hospital Cases:—On a Case of Injury of the Spine in the Cervical Region.* By WILLIAM MAC CORMAC, M.A., M.D.; Fellow of the Royal College of Surgeons, Ireland; Surgeon to the Belfast General Hospital.

THE great divergency of opinion subsisting amongst surgeons as to the propriety of trephining the spine in cases of injury induces me to make known the history of the following fatal case of fracture of the spine. I believe that the conclusions which the *post-mortem* examination suggests show that, in this instance at least, an operation could not either have prolonged or preserved life.

Although, no doubt, it must prove much more gratifying to record some successful surgical achievement, nevertheless, unsuccessful cases frequently yield an amount of instruction, and present features of interest, which successful ones do not and cannot always possess. No sense of false shame, therefore, should prevent surgeons from making public the unsuccessful issues of their efforts when they occur, at least as frequently as they do those that are successful.

Robert Crawford, a fine healthy looking young man, thirty years of age, was admitted to hospital under my care on the evening of the 15th August.

My colleague Dr. Browne happened to be present at the time. He found Crawford in a state of complete intoxication and unable to give any account of himself. It was consequently impossible to discover the nature or amount of the injury which the patient had sustained. Nor was it possible, at the time, otherwise to ascertain satisfactorily the particulars of the accident. The police who brought Crawford to hospital had not witnessed the occurrence, and as for the sufferer himself, being drunk, he could tell nothing about it. It subsequently appeared, however, that Crawford was sitting on two barrels which were placed in the cart he was driving, and that he fell sideways off these, turning a sort of summersault in the air, alighting on the ground on his back, clear of the wheel which, it is stated, did not pass over his neck.

When I visited my patient and inquired where he was hurt, he merely replied that he was bruised and sore, and stiff about the neck. I believed I had but to deal with a simple case of contusion, drunken men being rarely badly hurt. I was much surprised, however, on turning down the bedclothes, to find no trace of external injury whatever, but instead thereof a prominent swelling in the hypogastrium, and the penis in a state of priapism. The patient then informed me, in reply to my question, that he had made no water since he was hurt. This circumstance, along with the priapism, immediately aroused my suspicions, and I ascertained that the man was all but completely paralysed. The distended bladder, which reached nearly as high as the umbilicus, was at once emptied, the introduction of the catheter being attended with considerable difficulty on account of the erect condition of the penis, which was complete and persistent.

On examining the lower extremities, they were found wholly deprived of the power of motion, and absolutely without sensation. The trunk, also, as far up as the level of the fourth rib was in a

similar condition, and it was possible to trace out a sharp line of demarcation, as regards sensibility, by pricking the chest with a pin. The arms, too, were partially paralysed, the left slightly more so than the right. Along the ulnar border of each forearm the amount of sensation was much impaired, whilst on the radial side it seemed normal. Every attempt to excite reflex movements of the lower limbs proved unsuccessful, or was only responded to by a faint motion of the great toes. In fact the inferior extremities might almost literally be described as dead. The respiration was slow and laboured, and chiefly, if not entirely, diaphragmatic. The pulse was regular. But what seemed to me most extraordinary was the complete unconsciousness, on the part of the unfortunate man, of the great injury which he had sustained. His intelligence otherwise was unimpaired, and yet he made no complaint save that he felt a little sore. He was quite unaware that more than half his body might be said not to belong to him, and was with difficulty made to understand that he had met with a very serious accident.

Of course such symptoms as those described pointed clearly enough to an injury of the cord pretty high up. But when I endeavoured to localize the seat of the lesion, by an external examination, my difficulties began. The dorsal vertebræ showed no sign of displacement, nor were they tender on pressure, except the first, which during life was mistaken for the *vertebra prominens*. Immediately above the first dorsal vertebra was felt a slight depression, so slight, however, as to make one feel uncertain about its reality, as the patient was a very muscular man with a short neck. At this point excessive pain, stretching down the arms, was excited by pressure, and in the region of the fifth and sixth vertebræ there was also excessive tenderness. Every attempt at examining the spine occasioned much distress, and whenever the head had to be moved the patient grasped it with both hands in order the better to support it. It was therefore felt undesirable to subject the poor man to more frequent or lengthened examinations than were absolutely necessary.

Under such circumstances an exact diagnosis was necessarily somewhat difficult. I believed, however, that it was most probable that in the region where the pain on pressure was most acutely felt, there was fracture with compression of the cord. The position of the fracture at the time appeared to be about the sixth cervical vertebra, but on examination after death it proved

to be the seventh. What I was unable at the time satisfactorily to solve, was whether or not the injury was limited to one vertebra, or extended over two or more, an important element for consideration both as regarded the prognosis and treatment of the case.

In most respects the symptoms resembled those of similar cases. The urine, as early as the fourth day, became ammoniacal, and was afterwards excessively fetid. At first there was complete retention; but subsequently both urine and feces, the former often largely mixed with blood, came away involuntarily. In the earlier stages of the case there were no general symptoms of very great urgency. The appetite was unimpaired, the patient slept well, and complained of nothing. On the sixth day, however, vomiting set in, accompanied by flatulent distention of the stomach and bowels, and troublesome cough, with difficult expectoration. For a week the paralysis remained unchanged in amount, but then the power of grasping with the hands became feebler, and the patient complained of pain stretching down the ulnar border of each forearm. In the lower limbs there was no change, as they were absolutely bereft of power and sensation from the first. The face, or cheeks rather, now became much flushed, and remained so—a fact which has been explained by the occurrence of partial paralysis of the sympathetic. Nothing remarkable was observed with respect to the temperature. In the axilla, a clinical thermometer registered the temperature at $101^{\circ}\frac{4}{5}$ Fahrenheit, and between the thighs at $100^{\circ}\frac{4}{5}$, one degree less in the paralysed than in the only partially paralysed parts. The man, too, was now becoming decidedly weaker.

It was at this period, a week after the accident, that I took into consideration the propriety of trephining the spine, an operation ably advocated in the pages of this Journal by Dr. Robert M'Donnell. I was, nevertheless, dissuaded from doing so, partly because the experience of my colleagues rendered them opposed to the practice, partly because the nature of the symptoms led me to suspect a serious lesion of the cord, but chiefly on account of the difficulty of attaining to anything like certain knowledge of the exact nature and amount of injury that had been sustained.

It cannot now be a matter of much regret, when the result of the *post-mortem* examination is apparent, that I did not adopt the more active mode of treatment. But, if only for this reason, as also because this history supplements, in a certain measure, some of the facts and observations adduced by Dr. M'Donnell in his admirable and exhaustive papers, I thought it not undesirable, in the present

somewhat divided state of surgical opinion on the subject, to bring forward an account of this case.

Crawford lingered for an unusual time. Death did not take place until the fourteenth day after the accident. His progress downwards was very gradual. What troubled him most was the accumulation of mucus in the chest which he could not expectorate. The intelligence remained unclouded to the last. It was observable that during the three last days of life the pulse fell each day some five beats in frequency. The treatment really consisted in simply doing nothing.

Seventeen hours after death the *post-mortem* examination was made by myself in the presence of the hospital pupils. In the first instance, I went through the steps of the operation which I would have performed had I interfered surgically during life. An incision having been practised, four inches in length, over the lower cervical vertebræ and the first dorsal, I was, I must confess, surprised at the facility with which the spine was exposed. In the centre of the wound I felt the spinous process of what turned out to be the seventh cervical vertebra, loose and depressed beneath the general surface for fully two lines breadth. Before taking away this fractured portion, which could have been very readily done, I preferred removing the entire spine, or a considerable portion of it, in order that the parts might be preserved in exact relationship, and examined at leisure. Before doing so, however, I ascertained by passing my hand along the front of the spine that the anterior common ligament was uninjured, and that there was neither inequality nor displacement of the bodies of the vertebræ in that situation. The spinal column, with a portion of the ribs attached, was now carefully taken out as low as the middle of the dorsal region. The fractured spinous process was then seen to have been thrust into the intervertebral opening between the seventh cervical and first dorsal vertebræ, as represented in Fig. 1. It was more deeply driven in on the left than on the right side, and the tip of the spine was depressed, and rested upon the process underneath. As might almost be imagined from the wedge-shaped form of the fragment, the spinal marrow had been compressed, and, as a further examination disclosed, almost to complete division. The poor man was in fact "pithed," nearly as effectually as when the bull is stricken by the matador in the arena.

The fractured spinous process having been removed, the dura mater was seen occupying the exposed space, and apparently quite

uninjured. It betrayed nothing as to the vitally altered condition of the medulla underneath. The vertebral arches, excepting the injured one, were now sawn through and removed. Above the seat of injury the cord seemed entirely normal. Below, indeed, it appeared smaller than was natural, and the veins were slightly congested. Above and below the injured point, where a distinct sulcus could be detected, some lymph and a small clot had formed, which are shown in Fig. 3. The cord and its membranes were now carefully removed, and the latter dissected off in front, when it was ascertained that the medulla was lacerated, but no marked inflammatory softening was detected, nor were there any signs of meningitis. I had now an opportunity of again examining the spinal column, and there was not the smallest displacement of the bodies either in front or behind, but the intervertebral substance between the last cervical and the first dorsal vertebræ was much torn, and there was preternatural mobility between these two bones.

Professor Redfern was good enough to examine the cord for me after it had been a few days in spirit. He divided the dura mater posteriorly, and made the longitudinal section which is faithfully represented in Fig. 3. He wrote to me to say that "further examination has added to the certainty that the structure of the cord is entirely destroyed at the injured spot. Inflammatory changes occur within that spot, but I have failed to trace them any distance along the cord either upwards or downwards. I repeat what I said yesterday, that, in my opinion, an operation would have made this case worse."

On examining the longitudinal section made from before backwards by Professor Redfern, the crushed portion of the cord is seen to be injured beyond all possibility of repair. A few filaments, as it were, alone connect the upper and lower tracts of the medulla.

The rest of the body, upon inspection, displayed nothing of particular importance. The head was not opened; but the dependent portions of the lungs were almost solidified, owing to hypostatic congestion.

The woodcuts with which these observations have been illustrated are very accurately drawn of the actual size. Fig 1. is a side view of the spine, representing the degree to which the broken fragment was driven in. Fig. 2. represents this fragment separate, and Fig. 3. represents the longitudinal section of the medulla, and shows very faithfully the extent to which the cord has been divided.

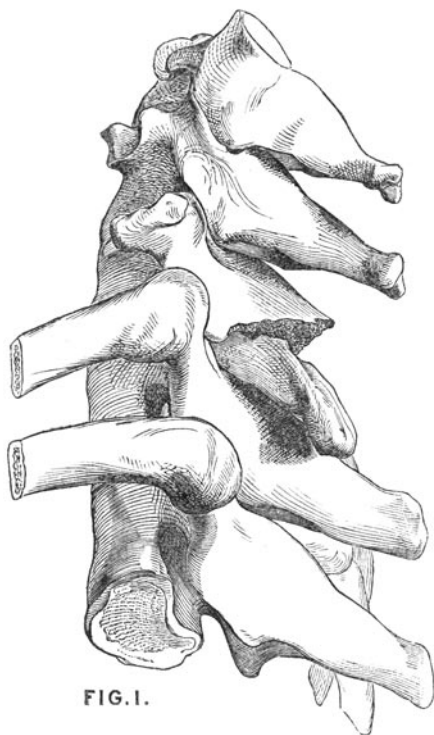


FIG. 1.

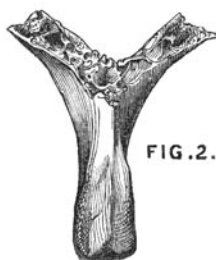


FIG. 2.

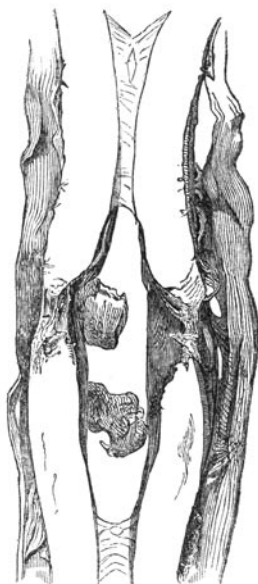


FIG. 3.

The history of this case presents, I think, several points of practical moment. In the first place, although the vertebral arch remained entire, and only a small portion of the laminae of the vertebra was detached with the spinous process, and there was no displacement by fracture or otherwise of the bodies, the nervous matter of the cord was damaged beyond all possibility of repair. An operation in this case, otherwise apparently well suited for it, must have completely failed, and there would have been nothing

during the course of the operation to indicate any cause for failure. The length of time the patient lived, after so severe an injury to the cord in the cervical region, and the very trifling inflammatory changes resulting, whether in the cord itself or in its membranes, are certainly uncommon. The almost total absence of reflex motion in a case of such complete division of the medulla was also very unusual, and there was nothing discovered which could in any way account for its non-existence. In this instance, at all events, it could only have led to disappointment, had this circumstance been looked upon as, in itself, yielding a motive for operation, as Dr. M'Donnell seems to consider it.

In conclusion, the tendency of this case, I conceive, is only the more strongly to show that even comparatively slight injuries of the bony case may be accompanied by total destruction of the important organ it contains within. At the same time, I would by no means wish to lay down that an exploratory operation or examination, in cases of paralysis following injury of the spine, is uncalled for or unjustifiable. If it can be proved, and I think it has been, to a certain extent, proved, that in some of these cases surgical interference has been able to effect a permanent and striking amelioration, if not a perfect cure, and that an operation is not necessarily dangerous to life, then it is, I would say, perfectly legitimate to attempt by these means to give the patient that chance of life which, by the plan of simply letting him alone, he is all but certain to lose.

ART. XII.—*On Some of the Morbid Conditions of the Optic Nerve; as seen by means of the Ophthalmoscope.* By HENRY WILSON, F.R.C.S.; L.K. & Q.C.P.; Member of the Royal Irish Academy, &c., &c.

THE optic nerve is rarely the seat of primary and independent disease. It is, as a rule, secondarily affected in consequence of disease in the adjoining ocular structures, or of the brain, and is most frequently seen co-existing with disease of the retina. In the present paper I purpose confining my remarks to the optic nerve alone.

A number of *congenital peculiarities* of the optic nerve have been