CASE
OF
P A R A L Y S I S,
WITHOUT LOSS OF SENSATION,
FROM DISEASE OF THE CERVICAL MEDULLA.

By JOHN WEBSTER, M.D.,
CONSULTING PHYSICIAN TO ST. GEORGE'S AND ST. JAMES'S DISPENSARY, ETC.

READ NOVEMBER 8TH, 1842.

CONSIDERABLE attention has recently been directed by medical practitioners to affections of the nervous system, especially since the physiological experiments and discoveries of the late Sir Charles Bell were made known to the profession. Besides the investigations of that celebrated anatomist, Dr. Marshall Hall, Mr. John Shaw, M. Foville, Sig. Beltingeri, and other physiologists, have by their labours thrown so much light upon these important subjects, that many hitherto intricate questions connected with the functions and diseases of nerves are now much better understood, and are more successfully treated than previously. Nevertheless, believing that any additional facts respecting inquiries of

the above description will prove acceptable to the Fellows of this learned Society, I am induced to bring under their notice the following history of an interesting case of disease in the cervical medulla, occurring in a gentleman, a patient of mine, who died in July last, after suffering from an illness of several years continuance ; and as an opportunity was then afforded of ascertaining the actual pathological changes of structure, by which the symptoms characterising the patient's malady during life were produced, the present narrative is consequently more complete, than it would have been otherwise.

This individual, although he was for many months totally unable to move, even in the slightest degree, any muscle situated lower than the neck, still retained the capability of feeling, quite perfect throughout the entire surface of the body ; whilst the other senses and intellectual faculties remained unimpaired to the last moment of his existence. Indeed, the patient's cuticular sensibility continued not only unaffected, but it even appeared, in the latter stages of the case, to be more acute than natural ; at the same time, that all power of effecting voluntary motion was entirely suspended in the trunk and extremities. This inability of making the slightest movement was so remarkable, that a bystander, ignorant of the patient's real condition, might have readily believed, from merely looking at him as he lay upon a couch, without noticing the movements of the head or countenance, that the inanimate body then before him was a corpse, rather than a

human being, endowed with mental faculties the same as in health, and possessing feelings even more acute than ordinary.

History.—W. H. G., Esq., æt. 36. Before describing the symptoms characterising the disease affecting this gentleman, it should be mentioned that he was endued with a strong muscular frame, was able to undergo a great deal of bodily exertion without fatigue ; and, until a few years before his death, had usually enjoyed excellent health, excepting that he suffered occasionally from severe headaches, which were, however, generally relieved by active purging. It is also of importance to mention, that this patient always perspired very freely in warm weather, or even after much exercise in cold ; nevertheless, from the commencement of his protracted illness, and throughout its continuance, the cuticular secretion became very scanty, and latterly it was entirely suppressed.

In the year 1836, Mr. G., whose health had hitherto been excellent, was annoyed for some months by a phagedenic ulcer on the left leg, from which he suffered much pain and inconvenience ; and although the sore afterwards got well, a similar ulceration on the leg again broke out in 1838, when it was followed, in the same year, by a large chronic ulcer on the posterior part of the pharynx. It is right however to state, that this local affection did not appear to be of a syphilitic character, and the patient, I was assured, never had any complaint of that nature. The ulceration in

the throat continued for some time without undergoing much alteration in appearance ; until, both from it, and from the sore leg, the patient's constitution was considerably deteriorated ; and as Mr. G. afterwards met with a severe domestic affliction, he also suffered much from mental depression.

Towards the end of autumn in 1839, Mr. G. again began to suffer materially in health ; he now complained of almost constant pains in the head, which occasionally became so severe, as even to oblige him to stop in the street, and to lean against the rails for support. These symptoms were also frequently accompanied by sickness and considerable prostration of strength ; the bowels being generally costive, the tongue much furred, and the appetite at the same time impaired. In January 1840, slight epileptic attacks now supervened, which were attended with an exceedingly slow pulse, varying generally from 35 to 40 in a minute. From this distressing state, Mr. G., however, recovered so much, as to be able to leave home about the end of February, and soon afterwards to resume, in some degree, his ordinary professional avocations.

In the following March, notwithstanding the above improvement, he was again attacked by several epileptic fits, but of a much more marked character than any of those noticed previously. These convulsive seizures occurred repeatedly ; and after some weeks, they were followed by severe

spasmodic contractions of the lower extremities, which often became so violent, that both knees were thereby forcibly drawn up towards the epigastrium, when the patient's legs would be again suddenly extended to their full length; and although the sufferer appeared perfectly cognizant of their occurrence, and often felt acute pain at the time, he was nevertheless quite unable to control any of these vehement involuntary movements of the extremities.

It should likewise be mentioned as a peculiar feature of the disease at this particular period, that often when talking to another person, Mr. G. was unable to finish the sentence he had just commenced, in consequence of an involuntary propensity, which he could not restrain, of repeating many times over some principal word in the phrase he wished to express; or the same difficulty would occur from making use of a word quite different from the one he really wished to employ; and this confusion in the use of words actually happened, without the patient being able to correct himself, although perfectly aware at the moment that he was speaking erroneously. At this period of the disease the pulse felt also very languid, but the circulation was never so slow as it had been during the previous attacks in January.

Subsequently, that is in the summer of 1840, Mr. G. complained of considerable weakness in his back and loins, accompanied with pains of the head, and in the nape of the neck. He soon afterwards

became unable to walk steadily without support : and, to use the patient's own words, " he felt as if his body were cut in two, and the lower half falling away from the upper." Both hands and arms now became very weak, and were soon nearly powerless ; and he also complained of considerable pain about the fourth cervical vertebra, increased in severity on merely bending his head backwards ; but this sensation felt however less painful when rotatory motion of the neck was only attempted.

About the end of autumn in 1840, as most of the symptoms had gradually undergone material alleviation, compared with their former severity, the patient seemed now greatly recovered in strength and could walk out occasionally, with only the aid of a staff. Indeed, towards the end of that year, the progress made was so far satisfactory, and the general health apparently so much restored, that Mr. G. was even able to visit his friends and join a little in society. During this temporary amendment, having dined at Kensington, on Christmas day, he was afterwards, in consequence of not meeting with a conveyance, unfortunately obliged to attempt walking to town, during a very cold and frosty night, when the streets were covered with snow. From the great exertions Mr. G. made on this occasion, he soon got so fatigued, that being totally unable to proceed the whole way on foot, he was taken home in a carriage, chilled and completely exhausted.

After this misadventure, all the symptoms from

which Mr. G. had previously suffered for a long time so peculiarly, again became as marked and severe as before, until the ability of moving any of his limbs got at last so very feeble, that eventually he was entirely deprived of the use of both legs and arms. Ultimately, the muscles of the abdomen and chest were similarly affected, whereby respiration could then be only carried on by the diaphragm ; when the patient likewise lost the power of coughing, and was scarcely able to expectorate. The bowels now became even more constipated than before, and in order to act upon them sufficiently, it was necessary to employ very active purgatives, assisted by strong enemata ; whilst the bladder required to be frequently emptied by the catheter, during many months consecutively. Notwithstanding the total loss of power over all the muscles situated lower than the neck, the sense of touch still continued as acute as ever throughout the entire frame ; indeed, the cuticular surface appeared occasionally to be even more sensible to external impressions than in the patient's previous good health ; since he could, for instance, feel most acutely the slightest change in the temperature of the surrounding atmosphere, especially when a current of air passed over any part of his person.

Although the patient appeared, at a subsequent period of his disease, to have acquired a slight degree of control over some of the muscles connected with the shoulder, so as to be then able to move partially that part of his body, such temporary

power was again soon lost; and ultimately the privation of voluntary motion remained as marked as before, excepting in the head, the features, and the tongue; or in the muscles of deglutition, which were never affected. At the same time that these symptoms prevailed, all the senses continued perfectly normal, the memory appeared unimpaired, the patient had no headache, and his intellectual faculties were as perfect as they had ever been at any former period, although once or twice he seemed to be a little confused or slightly delirious; but this symptom was of such partial duration, that it scarcely deserves observation.

Besides the symptoms already detailed, Mr. G. frequently complained of feeling intense heat over all the body, whilst the surface actually felt cold to a bystander; and at other times he experienced alternations of heat and cold, although his skin appeared to others of the natural temperature. Again, if a foot or even a toe were touched, spasmodic twitchings of the limb, accompanied with pain, were always produced; the patient's sense of feeling being, at the same time, so accurate, that he could distinctly tell the particular point of his body to which the attendant's finger was applied. The circulation still continued languid, and sometimes the pulse was intermitting; whilst the cuticle remained devoid of perspiration, being perfectly dry, and exhibiting quite an opposite condition to that noticed during the patient's previous robust health.

In the latter months of his illness, Mr. G. often complained of excessive coldness in the epigastrium and stomach, along with considerable distension of the abdomen from flatus, although the trunk of the body and the extremities frequently felt burning hot to the patient at the same moment. At this stage of the disease, the spasmodic twitchings of the legs were not only more frequent than previously, but they sometimes even became so violent as almost to throw the patient off his couch, being also attended with great additional suffering.

Besides these symptoms, it ought to be mentioned that the urine, which at first was very little altered from its healthy condition, now deposited a considerable quantity of a thick ropy sediment, and although this secretion had long been drawn off by the catheter, it now passed involuntarily, and almost in drops ; whilst the fæces likewise came away in a similar manner, the evacuations being of a watery consistence, and latterly very offensive.

The appetite and digestion, always much impaired, entirely failed towards the termination of this painful and protracted malady ; when frequent nausea, vomiting, singultus and apthæ supervened. Finally, notwithstanding the efforts made to alleviate the afflicted patient's sufferings, all the symptoms continued, with unmitigated severity till the 22nd of July last, when Mr. G. died, quite exhausted ; retaining however his intellectual faculties perfect to the last moment of existence.

Treatment.—Respecting the means pursued in

the alleviation of Mr. G.'s lingering malady, it will suffice to state generally, that having the advantage of being frequently seen by Dr. Chambers, Dr. Seymour, Sir Benjamin Brodie, and Mr. Tatum, who repeatedly met me in consultation, every remedy likely to mitigate the symptoms, when even no hope existed of curing the disease, was had recourse to; but all proved either inefficient, or produced only temporary benefit. Among the remedies employed, purgatives with strong enemata were found to be most beneficial, especially when the latter contained confection of rue. The tincture of cantharides, given as a diuretic, seemed likewise of considerable efficacy, at the same time that leeches were applied near the spot on the nape of the neck, where pain was felt on moving the head backwards; their application being followed by blisters. Subsequently, a constant discharge was maintained from two issues, about four square inches in size, on each side of the spinal column, which were kept open for many months, by a mixture of mercurial and blistering ointments. The drain thus produced was considerable, and at one time it seemed to be rather advantageous; but the relief obtained from it, or indeed from any remedy, was only transitory, and never very decided.

Besides the above plan of treatment, mercury, sarsaparilla, hydriodate of potassa, strychnia, hydrocyanic acid, morphia, and various other medicines, which it would be superfluous to detail, were likewise tried, but without any beneficial or permanent

result. Respecting one of the remedies just named, it deserves to be noticed as a peculiar feature in the present case, that although mercury was administered internally in very large doses, and rubbed in to an unusual extent, for some months consecutively, whilst both the issues were constantly dressed with mercurial and blistering ointments, this powerful mineral scarcely produced any apparent effect, either upon the patient's mouth, or his system generally.

During the last months of Mr. G.'s existence, notwithstanding the treatment seemed to have very little power over the disease, and although an unfavourable prognosis was for a long time entertained, nevertheless to alleviate the almost tetanic symptoms, to procure sleep, and, if possible, to give temporary ease to the afflicted patient, morphia was frequently administered, and in large doses; indeed, towards the fatal termination of the case, this excellent anodyne was the chief remedy trusted to for relief; and however hopeless of curing the patient, its use certainly diminished the severe sufferings, and tended to soothe the acute pain of his latter moments.

Autopsy.—About eighteen hours after death, the examination was very carefully made by Mr. Hewett, in the presence of Dr. Nairne, Mr. Tatum, Mr. Charles Hawkins, Mr. Powell and myself. From notes made at the time, I have since drawn up the following Report of the pathological appearances met with:—

The body appeared considerably emaciated, but was not discoloured. Having removed the skull

cap, some effusion of lymph was found under the arachnoid membrane covering the left side of the brain, along with turgescence of that, and the other hemisphere ; both divisions being pale, and exhibiting a watery aspect, although their texture was firm and compacted. The ventricles of the brain seemed large, particularly the left ; and about two ounces of serum were effused in these cavities ; the foramen commune being at the same time larger than natural. The arachnoid tissue extending over the pons Varolii adhered to the parietal layer of that membrane ; but no tumour, or any other change of structure was found either in the brain or cerebellum, excepting that the latter organ appeared anemic, and rather softer in texture than ordinary.

On opening the thorax, every part seemed quite healthy, although the pleura pulmonalis on the left side of the chest, adhered firmly to the pleura costalis, by a few strong bands, some of which were apparently of considerable standing. The abdominal viscera likewise appeared very little changed from their natural condition, the liver, stomach and intestines being free from disease : with the exception of the kidneys, which were somewhat enlarged, anemic, and exhibited marks of chronic inflammation on the internal membrane of the pelvis and infundibula. The omentum and some of the small intestines also adhered to the bladder by strong bands, whilst that viscus was much diminished in magnitude, felt very hard to the touch, and on cutting into its cavity, it actually appeared not

larger than the interior of an ordinary sized walnut, its muscular coat being unusually thickened. The mucous membrane was dark-coloured and rugous on the surface.

Having carefully laid open the vertebral column, throughout its whole length, the theca, corresponding to the three or four lower cervical vertebræ, was found to be much distended ; and on being cut into, the arachnoid cavity, with the sub-arachnoid tissue, appeared filled with lymph, which evidently had been some time effused ; as the membranes were thereby united to each other, and also to the cord. On making a more minute examination of the parts, the adhesions of the membranes to the cord were discovered to be much firmer at its anterior, than posterior portion ; indeed, they were actually so strong, as to be inseparable from the medulla without rupture. At this particular part, the medulla also appeared larger than usual, felt soft and pulpy to the touch, and on being divided by the knife, its substance seemed to be in an almost diffuent state, infiltrated with serum, but exhibiting a natural colour. For the extent of half an inch above the point just described, the cord had a dusky red tinge, appearing however, of the ordinary consistence. In the anterior and posterior columns, not much difference was observable to the naked eye, at the first superficial examination of the diseased part of the medulla ; although both divisions of the cord seemed considerably softened, infiltrated and disorganised, particularly in the posterior columns ; whilst as well above,

as below the affected portion, the medulla was healthy, and quite natural in appearance.

Since it is often very difficult by the ordinary means of investigation, to describe accurately all the minute alterations of structure, which disease may induce in so delicate a texture as the spinal cord, the microscope becomes an important auxiliary to scientific anatomists. Indeed, without the aid of that useful instrument, it would in many cases be difficult, if not impossible, to ascertain correctly the actual pathological changes of structure, which have taken place in that organ, so as to be able to explain the phenomena and symptoms characterising cases like the one now under consideration.

Fortunately on the present occasion, such a desideratum has been supplied ; as I am enabled to exhibit to the Fellows of the Society, not only the diseased portion of the cord, but likewise to add a minute and valuable account of its microscopical examination, which that able physiologist, Professor Todd, of King's College, has had the kindness to make, for the express purpose of being appended to the present communication. In the letter that gentleman did me the honour to write, after examining the diseased part of the medulla transmitted to him for investigation, he says, " The portion of spinal cord submitted to me by Dr. Webster, appears to consist of the greater part of the cervical segment. I find great destruction (from softening) of the medullary substance of the posterior columns, especially

that of the right side ; the antero-lateral columns seem to have been also the seat of the softening process to a less degree, but I do not find that they have suffered any loss of substance. In examining the softened parts by the microscope, I detected very few of the proper nerve-tubes ; and those which I did observe, were much altered from their natural appearance ; they had become opaque, and had assumed an indistinctly fibrous aspect. I was unable to find any trace of grey matter. The posterior horns must have shared in the great destruction of the posterior columns, and probably the anterior ones experienced a similar fate. It is right, however, to observe, that the specimen had been preserved some time in spirits, before it came into my hands. I found throughout the diseased part, numerous small scales, (cholesterine ?) such as are very commonly met with in portions of the nervous centres preserved in spirits."

Dr. Todd then makes the subsequent very important remarks :—"I consider this case of the greatest physiological interest, as affording unequivocal proof, that the posterior columns cannot perform the office assigned to them by some physiologists, namely, that of conducting sensitive impressions to the brain, or at least, that they are not the only channels of this communication. It is also important in an anatomical point of view, as showing that the posterior roots of the nerves are independent of the posterior columns of the spinal cord ; for although the latter were destroyed

to so great an extent, the former did not appear to have suffered in any degree."

Observations.—This instructive and interesting example of disease of the nervous system excited, as it well might, much attention in all those who witnessed its progress; and they, along with myself, confidently hoped, that the pathological appearances met with on dissection would be such as to explain satisfactorily the rationale of the peculiar symptoms, which the malady exhibited during the patient's protracted and severe sufferings; more especially, in regard to those remarkable features characterising the case, namely, that whilst sensation remained unimpaired, voluntary motion was totally suspended. Because, should these anticipations be realized by the *post mortem* examination, some important pathological facts, worthy of being recorded, would thereby be added to the points already established, as well regarding the actual seat, as likewise the courses of transmission of those functions. The autopsy, with the microscopical inspection of the diseased part of the medullary cord now given, although they sufficiently account for the loss of motion, do not explain why the patient's sensations remained not only unimpaired, but even appeared to be more acute than natural.

Physiologists might undoubtedly urge, since there appeared more indications of inflammation having existed in the anterior than in the posterior columns of the cord, as shown by the firmer adhesions of the membranes to them and to each other, at the

diseased part of the cervical medulla, such circumstances may be thought by some, sufficient to explain most of the phenomena observed during the patient's life. Nevertheless, in these difficult and often disputed questions respecting the functions and diseases of the nervous system, other physiologists may conclude, and with considerable show of reason, that the loss of motion, so remarkable in this instance, was solely owing to the generally softened condition of the anterior part of the cord, which change in all probability arose from the previous inflammation already mentioned.

Besides these considerations, it is also deserving of notice, that the reddened state of the cord, above the softened portion of that organ, indicated such a degree of irritation in the spinal medulla, as would sufficiently account for the occurrence of those spasmodic actions of the lower extremities noticed in the case, and from which the patient latterly suffered so severely ; whilst it is also probable, that had he lived for a longer period of time, the extent of disease in the cervical medulla would have been materially augmented.

As these, with some other interesting points, respecting the nature and seat of affections implicating the nerves, and exhibiting symptoms similar to the case above described, are still surrounded by considerable difficulty, more extensive experience, supported by dissections, is necessary to enable physicians to explain some of the discrepancies in

opinion yet prevalent among physiologists on these important subjects; I therefore submit this case to the notice of the Society, as an instructive and somewhat rare example of disease of the nervous system, which in my opinion appears worthy of attentive consideration.