DISLOCATION

OF

CERVICAL VERTEBRÆ,

WITHOUT FATAL RESULTS.

BY

G. L. WALTON, M. D.,

INSTRUCTOR IN DISEASES OF THE NERVOUS SYSTEM, HARVARD UNIVERSITY;
PHYSICIAN TO THE NEUROLOGICAL DEPARTMENT OF THE MASSACHUSETTS GENERAL HOSPITAL.

Reprinted from the Boston Medical and Surgical Journal of May 8, 1890.

BOSTON:
DAMRELL & UPHAM, PUBLISHERS,
283 Washington Street.
1890.

S. J. PARKHILL & CO., PRINTERS
BOSTON

DISLOCATION OF CERVICAL VERTEBRÆ WITHOUT FATAL RESULTS.[1]

BY G. L. WALTON, M.D.,
Instructor in Diseases of the Nervous System, Harvard University; Physician to the Neurological Department of the Massachusetts General Hospital.

SINCE publishing in this journal[2] in 1889, a record of five cases of dislocation of cervical vertebræ resulting in practical recovery, I have seen three other similar cases, an experience which would seem to indicate that such cases are not rare, the condition probably not infrequently escaping recognition through lack of familiarity with its distinguishing features. The unilateral form of dislocation is that most likely to be overlooked, the bilateral form causing generally such marked symptoms, from pressure on the cord, as to leave no doubt of the diagnosis, besides showing unmistakable prominence of spinous processes in case the dislocation is backward, or their absence, in case it is forward, while the marked misplacement of the head, forward in the former case, and backward in the latter, is evident to the most casual observer. Again, a fatal termination is the usual, though by no means the constant termination of the bilateral variety, unless fortunately it is reduced either spontaneously or by operation.

There are, on the other hand, probably many cases of unilateral dislocation with practical recovery which

[1] Read before the Boston Society for Medical Improvement, March 10, 1890.

[2] Dislocation of cervical vertebræ; five cases; recovery without operation. Read at the meeting of the American Neurological Association, September, 1888, and published also in the Journal of Nervous and Mental Disease.

have never been recognized as such, on account of the lack of paralytic symptoms (the cord escaping pressure) and on account of the comparatively comfortable condition of the patient.

Such cases present themselves, generally, with a history of a fall, possibly followed by temporary paralysis of the legs and arms with or without retention of urine, but showing at present either no paralytic symptoms, or symptoms comparatively limited. Lack of mobility in the cervical region will be noted, however, where reduction has not taken place, the head in typical cases being held in a position resembling that of torticollis resulting from spasm of the sterno-mastoid. Careful examination will show, however, that this muscle is comparatively lax on the side which would be affected to produce the deformity, while that on the other side is in a state of more or less pronounced tension, through being put upon the stretch; the same condition being noted in other cervical muscles. This is the first sign which draws attention to the spinal column, as the probable seat of injury. Further examination shows that the flexibility of the column is lessened, that passive motion is restricted in certain, if not in all directions, and that such efforts cause pain. More or less sensitiveness will, probably also be found near the region implicated, and perhaps a prominence of the transverse processes on one side.

These points will lead to the correct diagnosis even if no irregularity in the spinal column is detected either by external examination, or by the finger in the pharynx, such irregularity being much more difficult to detect in the cervical than in the dorsal or lumbar region, especially in the fleshy subject.

In examining a case of suspected unilateral dislocation, the view from the back should not be neglected. Inspection from behind showing the head to be tilted,

so that one ear is notably higher than the other, the head being also somewhat rotated, and in some cases set off as a whole to one side. These points may be noted in Figures 1 and 2.

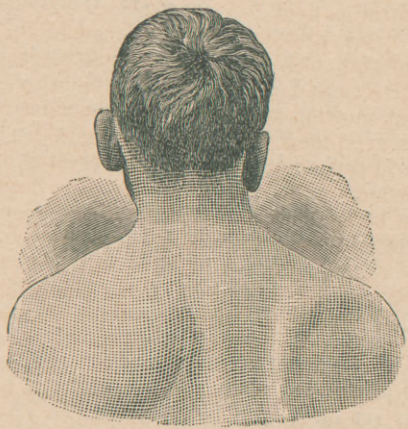

FIG. 1. Typical position of head in unilateral dislocation, as viewed posteriorly.

The first case I have to report, was a patient in the surgical wards of the Massachusetts General Hospital, in the service of Dr. M. H. Richardson, with whom I saw him in consultation. This patient was photographed for me by Dr. Storer, the rear view resembling that shown in Figure 1, so nearly, as hardly to require insertion.

CASE I. J. C., a carpenter, twenty-one years of age, was admitted to the hospital in August, 1889, with a history of having fallen fifteen feet from a staging on the 5th of June, last, striking on the forehead. He was taken up insensible. He entered the Haverhill Hospital at the time, and remained there

under treatment for two weeks, suffering for ten days after the accident from pains in the abdomen above the umbilicus, and in the thorax, back and shoulders as well as in the neck. No other symptoms, except loss of strength were noticeable.

The patient now states that his general health is good, that he has a good appetite, that the bowels are regular, and that there are no bladder symptoms. He complains of shooting pains in the back of the neck, especially on the left side, the pains being worse towards night.

Examination shows that motion of the head is limited. As a measure of the limit of rotation, it is noted that the nose moves through an arc of five inches only, one and one-half inch to the right, and three and one-half inches to the left. Backward flexion and tilting are also limited. He cannot approximate the chin to the chest. The head is bent slightly to the right, with the chin pointing to the left shoulder. The head, as a whole, is set off to the left, the muscles of the neck on the right, however, are lax. There is no loss of sensation or motion. There is tenderness over the second, third and fourth cervical vertebræ, the third being very prominent. The knee-jerk is very active, and there is a slight tendency to clonus on the left.

The diagnosis was made of unilateral dislocation of cervical vertebræ, probably the third upon the fourth. No operation was advised, it being deemed best to let well enough alone.

The next case is at present under treatment in the neurological department of the Massachusetts General Hospital, and is of great interest in connection with the comparatively recent observations of Ross, Thorburn, Gowers and others regarding localizing symptoms in spinal injury. It will be seen that both the motor and sensory disturbances point to the lower part

of the cervical region, probably implicating the seventh and eighth cervical, and first dorsal nerve-roots.

Case II. T. S., thirty-six years of age, a waiter, fell, or was thrown, from a car, striking violently upon the vertex. He was unconscious for a short time. Retention of urine followed, requiring the use of the catheter. For two weeks there was complete loss of motion in the arms and legs, with loss of sensation to the groin in the legs. There has been gradual improvement up to the present time. The neck seems to him shorter than before, and the family notice that the head is held in a one-sided manner which was not the case before the accident.

Physical Examination. — There are extensive scars over the posterior parietal region extending well to the right, quite irregular. The region involved reaches back to the junction of the sagittal with the lambdoid suture. The scars are adherent in places, and show considerable loss of substance, but are not sensitive. Movements of the neck are limited in all directions, especially in backward flexion. The head is held well forward, and somewhat to one side (the left). Forced movements of the head cause pain in the lower cervical region. There is tenderness on both sides of the spinous processes in this region, which are rather prominent. The gait is stiff and unsteady. The knee-jerk is normal, nutrition is fairly good in the legs. Sensation is everywhere normal, excepting on the ulnar side of both arms, their whole length, including the little and ring fingers. There is complete paralysis of the extensors of the fingers and thumb in the left hand, and of the extensor carpi ulnaris, accompanied by atrophy and degeneration reaction. The interossei, abductor pollicis and flexor brevis pollicis show the same condition, but in a less marked degree. Quite unaffected are the biceps, triceps and deltoid, the flexors, pronators and supinator, longus and brevis.

The splenius capitis muscle seems quite tense in the left, while that on the right is lax.

This patient has improved greatly during the two weeks he has been under observation, both as regards general symptoms, and as regards the position of the head. The gait is now practically perfect. The head is tilted less, but is still held quite stiffly forward and set off somewhat to the left. Motion in all directions is still limited and painful. The sensitiveness has practically disappeared. A vertical line dropped from the left ear falls a half-inch further away from the line of the spinous processes in the upper dorsal region, than one dropped from the right ear. The motor paralysis remains the same, the anæsthesia is still present, and still marked in outline through not great in degree. The position of the head is shown in the photographs taken for me by Dr. Kingsley (not inserted) on the back view, the elevation of the ear, and setting off of the head, will be noted, though the degree is less than in the other cases.

Great aid is given us in this case by a study of the distribution of spinal paralysis, and the importance of the work done in this direction can hardly be overestimated, especially since operative interference in spinal lesions has become a matter of practical consideration. The physiological observations of Ferrier and Yeo [3] on the monkey, together with the anatomical studies of Herringham,[4] by dissecting the human subject, have been so far confirmed by clinical observation as to give quite accurate data on this subject. Certain minor discrepancies still exist, and toward their reconciliation every observation is likely to contribute, hence the detail I have gone into in recording this case.

[3] Proceedings of the Royal Society, No. ccxii, p. 12. Brain, 1882.
[4] Proceedings of the Royal Society, No. ccxliii, 1886, p. 255.

In a general way, as brought out by Ross,[5] and confirmed by Thorburn,[6] the fifth root supplies sensation over the deltoid, and down the radial side of the arm, to the base of the thumb, the eighth cervical and first dorsal supply the little finger and ulnar side of the hand and arm, the intermediate roots supplying the intermediate territory, extensions of anæsthesia from the ulnar towards the radial side indicating extension upwards from the eighth toward the fifth, and *vice versa*.

This distribution is easily remembered by the embryological explanation of Ross, that the arm, in budding out from the trunk, carries with it the anterior primary divisions of the spinal segmental nerves from the fifth cervical to the first dorsal. In the embryological position the radius is upwards and the palm forward. The several sensory roots will supply, therefore, the skin from the radial to the ulnar side in regular order.

In our case the anæsthesia involved the ulnar side of the arm and hand including the ring as well as the little finger, corresponding very nearly to the brachial distribution of anæsthesia in the case recently reported by Herton,[7] excepting that the tip of the middle finger was involved on the left, and that of the middle and index fingers on the right, in his case. In the case alluded to, autopsy revealed a dislocation forward of the sixth upon the seventh cervical vertebræ with fracture through the left superior articular process of the sixth cervical vertebræ.

As regards the motor distribution, the interossei and other intrinsic muscles of the hand are furnished, according to Thorburn's table, by the first dorsal, the flexors of the wrist by the eighth cervical, and the extensors of the wrist by the seventh cervical nerve-

[5] Brain, January, 1888.
[6] A contribution to the surgery of the spinal cord.
[7] Journal of Nervous and Mental Diseases, January 1890, p. 18.

roots, the other arm and shoulder muscles deriving their origin from the sixth, fifth and fourth cervical nerves, none of which would appear to be injured in our case. The extensors of the fingers are omitted in Thorburn's tables, but in Gower's tables they are placed with those of the wrist, which he refers to the sixth and seventh roots. The immunity of the flexor carpi radialis was the peculiar feature of our case. Dislocation unaccompanied by fracture would hardly be expected so low down, yet the history of the case, with its rapid improvement militates against fracture.

In further illustration of spinal localization we have at present under treatment in the same clinic a patient (whose case will later be reported in full by Dr. Putnam) who was struck by a locomotive, rendered unconscious for a short time, recovering with loss of motion and sensation in the left arm, and in lesser degree in the right. The mobility of the neck precluded dislocation, even with reduction. The distribution of paralysis is as follows: Sensory: Anæsthesia over the shoulder and radial side of the arm, extending well over toward the ulnar side; Motor: Paralysis with atrophy and degeneration reaction implicating the deltoid, triceps, biceps, supinator longus and brevis, supra- and infra-spinatus, pectoralis major and latissimus dorsi. The injury was probably either a stretching of the nerve-roots, more particularly on the left, from about the fourth to the seventh, inclusive, or a hæmorrhage about the cord in the corresponding locality.

One of the cases reported in my previous paper illustrates the localization still further. In this case there was typical unilateral dislocation, apparently of the third upon the fourth vertebræ, followed by paralysis and atrophy, affecting in a marked measure the

supra- and infra-spinatus muscles on the left, as seen in Figure 2. These muscles are alluded to by Thorburn, as furnished by the fourth cervical nerve roots.

The third case, which came under my observation in the same clinic, can hardly be explained, taking both the history, and the present physical examination into

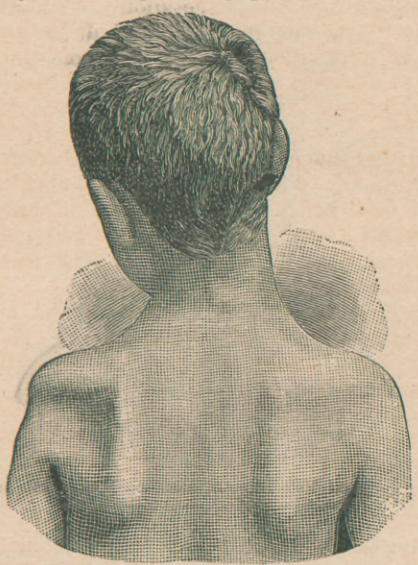

FIG. 2. Unilateral dislocation. Atropy of supra- and infra-spinatus muscles on the left.

consideration, on any other supposition than that of a dislocation of cervical vertebræ, spontaneously reduced.

CASE III. J. P. W., thirty-eight years of age, married; occupation a currier; gives a history of a fall of fifteen feet, landing on the vertex in the sand. He did not lose consciousness, but lost the power of

the legs for a few days. There was no urinary disturbance. There was no hæmorrhage from the nose or ears, no conjunctival ecchymosis. He was in bed for two weeks. The chin was immovably fixed on the breast for sometime after the fall. There was a stinging pain in the back, and grating in the neck with pain on movement, with numb sensation up to the back of the head. Most of the symptoms disappeared in a short time. The head is still held somewhat stiffly

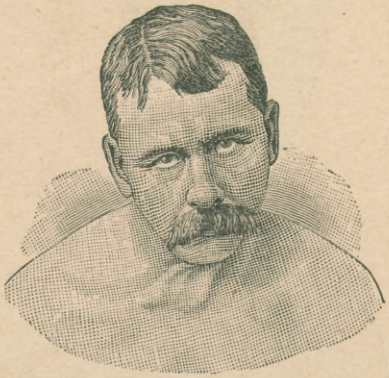

FIG. 3. Unilateral dislocation of atlas upon axis. Sterno-mastoid tense on the left, lax on the right.

forward, there is limitation on backward flexion, and in less degree on rotation. No irregularity is detected in the spinous processes. There is now no paralysis of motion or sensation. Examination of the eyes is negative. There is no rigidity of the muscles of the neck, the limitation of motion being apparently connected with the vertebral column.

Allusion has been made to the fact that the muscles on one side are lax in unilateral dislocation (see Figure

3), while those on the other are put upon the stretch. It might be assumed that the exact converse should be looked for in cases of torticollis. This is not, however, always the case, because the muscles on the non-spasmodic side may be also put upon the stretch in torticollis, as is seen in Figure 4.

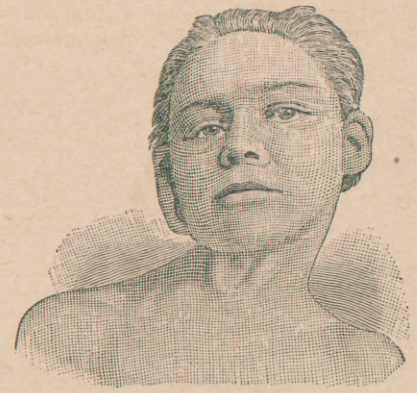

FIG. 4. Torticollis. Position resembling unilateral dislocation. Both sterno-mastoids prominent.

In this case (a patient in the Good Samaritan operated on by Dr. E. H. Bradford), the right sterno-mastoid is plainly affected with spasm, but the left sterno-mastoid also appears tense on account of being put on the stretch by the great displacement of the head, its position resembling in a marked degree that of unilateral dislocation.