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The Treatment of Vertebral Cervical Dislocation by the Cloward's Method

Leczenie zwichnięć kręgosłupa szyjnego metodą Clowarda

From the traumatological point of view, vertebral cervical dislocation requires in the preliminary phase a thorough radiological diagnosis. Its aim is to establish the level of dislocation, the direction of vertebral body displacement, the presence of fracture of the vertebral arch and spinous processes and the position of articular processes. At the same time, a careful clinical examination designating the level of paresis or paralysis, the degree of respiratory insufficiency and circulatory disturbances is necessary. The assessment of neurological conditions is indispensable because this shows the severity of changes within the spinal cord (1, 3, 5).

In every case of vertebral cervical dislocation, especially with accompanying neurological complications, it is necessary to apply temporarily direct traction to the skull using the Crutchfield calipers with proportional and doses load as well as an appropriate position. The early phase of therapeutic management also includes action to prevent bedsores. Vertebral dislocation can usually be reduced by means of traction. Apart from that, however, a surgical procedure should be considered. The operation must be performed shortly after the injury allowing the time for diagnosis, preparation of instruments and improvement of patient's general condition. The method of operation is still controversial. Some surgeons, especially orthopaedists, are advocates of posterior stabilization of the spinal column. However, the majority definitely prefer anterior access which enables to reduce dislocation, to remove the displaced nucleus pulposus and to wedge the bodies of the adjacent vertebrae with a bone chip placed in an opening drilled at their boundary (2, 4, 6).

Our own experience based on the case of 14 patients operated on by the Cloward's method in our Clinic supports such management. The age of operated patients ranged from 19 to 78 years and the mean was 47 years. Only one person was 19 years old and two persons were over 70. So most of them were middle-aged people. There were 9 men and 5 women in the analyzed group. The prevailing majority were agricultural workers. Only two types of accidents were causes of dislocation, i.e. a fall on the head from a height, most often from a horse cart or a tractor, or a jump on the head to the water of wrongly estimated depth

— 8 patients, and a road accident in which the car falls on its roof — 6 patients. It was usually a homogeneous lesion, sometimes accompanied only by minor injuries to other parts of the body.

The review of roentgenograms of this group of patients clearly points out to a more frequent dislocation between C5-C6 (7 cases), then C6-C7 (3 cases), C3-C4 (2 cases), and one case of dislocation between C4 and C5. The degree of displacement estimated on the basis of the vertebral body diameter was various, most often, however, it was considerable. Displacement of the whole of the vertebral body was found in two patients, of $^2/_3$ in five patients, and of half of the vertebral body in seven patients. In many cases dislocation at the level of transverse processes and rotation displacement were also present (Figs 1—3). It is clearly seen that hyperflexion mechanism of the injury prevailed in the presented cases since there was no damage to vertebral arches and spinous processes, which is usually present in hyperextension injuries (7).

The spinal cord complications are certainly connected with the extent of vertebral displacement during dislocation. In two patients with complete vertebral dislocation there was tetraplegia. Such paralysis was also present in the two patients with dislocation of $^2/_3$ of the vertebral body. In this group there was the upper limbs paresis as well as in two patients. Although it is not a big group, it seems, nevertheless, that the greatest threat of spinal paralysis is dislocation at the level C5-C6.

After admission to the Clinic and making diagnosis direct traction to the skull was always applied, most often with the Crutchfield skull calipers. The traction was treated as preparation for surgery since temporary reduction of pressure within the spinal cord and improvement of spinal circulation are not without importance. The traction load was dosed until dislocation was reduced (from 5 to even 10 kg). The surgery was performed on the 1st—2nd day, full information about the patient's condition having been obtained. The supine position was used with turning the head to the left and maintaining traction. The incision was always made on the right side at the boundary line of the sternocleidomastoid muscle on its medial side. The deeper tissues were dissected longitudinally drawing aside the cervical vessels laterally and the oesophagus in the medial direction. Localization of dislocation was easy and there was no need for radiological identification. The anterior longitudinal ligament was incised above the site of dislocation and drawn aside. If there was still any vertebral body displacement, it was also reduced. An opening was drilled at the boundary of two vertebrae through its full thickness, the remaining parts of the nucleus pulposus were removed, and the condition of the spinal cord was checked. Bleeding was controlled with scrupulous care. A bone chip from the iliac ala was wedged in the opening and the calipers were removed. The wedging was always so reliable that we did not use any other additional stabilization. The wound was sutured using suction drainage. After the surgery no immobilization was applied until the

wound was healed. Since the 10th day after admission a stabilizing collar was put on. First, sitting up and then, gradually, assuming the upright position and walking were recommended. Obviously it was possible in patients without paralysis or in those with paresis of the upper limbs only. Other patients were adapted to move in wheelchairs.

The early results make it possible for us to form a favourable opinion about this method in the treatment of vertebral cervical dislocation. The method protected from a secondary dislocation and it was a good bearing support. After some time reconstruction resulting in the fusion of both vertebrae took place. No tendency was found for the wedged chip to slip out (Figs 4, 5). We did not have any complications in wound healing, neither in the area of access to the spine nor at the site of collecting the graft. The surgical procedure largely facilitated nursing care of patients as it created the possibility of changing position from the first day after the operation as well as early assuming the upright posture. Complete tetraplagia did not subside after the operation, in partial paralysis, however, there was a significant improvement of the upper limbs functions achieved later in the course of rehabilitation. The patients without the spinal cord symptoms quickly regained their physical condition which allowed them to leave the hospital after the operation, and then they resumed their occupations.

It seems therefore that the operation of vertebral cervical dislocations by the Cloward's method is worth recommending. The anterior access through longitudinal dissection of the tissues is relatively easy and it exerts little strain on the patient. In this way we have a possibility of reducing dislocation and removing through a trephined opening the remaining parts of the displaced nucleus pulposus and the annulus fibrosus. The pressure on the spinal cord is relieved and the local view of the spinal canal is obtained. The well wedged bone chip stabilizes temporarily the injured area of the spinal column and subsequently creates a block of two vetrebrae that provides added protection and strength to the whole cervical area of the spine.

On the basis of our clinical material we can put forward a statement that dislocations in the cervical part of the spine, irrespective of the degree of vertebral displacement and the kind of the spinal cord complications, require a surgical procedure. In this regard, the Cloward's method can be considered appropriate.

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STRESZCZENIE

Na podstawie obserwacji 14 chorych operowanych metodą Clowarda z powodu różnego stopnia zwichnięcia kręgosłupa szyjnego oceniono przydatność tej metody. Zabieg ten jest prosty, bezpieczny i przynosi korzystne rezultaty doraźne oraz następcze. Wiadomo, że zwichnięcia kręgosłupa szyjnego wymagają zawsze postępowania operacyjnego, dlatego sposób Clowarda należy uznać za właściwy.

Fig. 1. Lateral roentgenogram of the cervical spine showing a complete anterior dislocation C5-C6 with injury to the vertebral arch and spinous process

Fig. 2. Lateral roentgenogram of the cervical spine showing anterior dislocation C5-C6 with displacement of half $^{2}/_{3}$ of the vertebral body

Fig. 3. Lateral roentgenogram of the cervical spine showing anterior dislocation C5-C6 with displacement of half of the vertebral body and injury to the arch and spinous processes

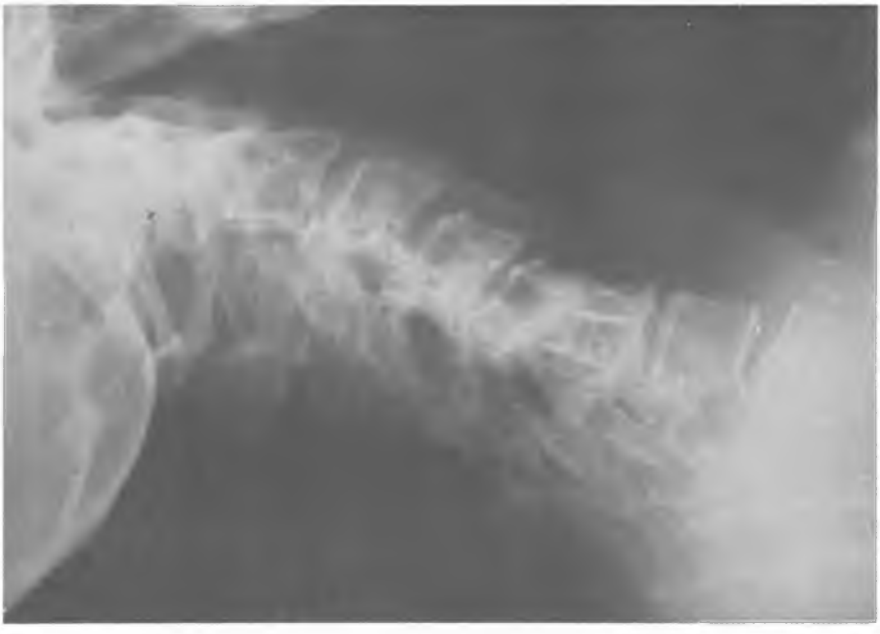

Fig. 5. Lateral roentgenogram of the cervical spine with post-operative spondylodesis by the Cloward's method

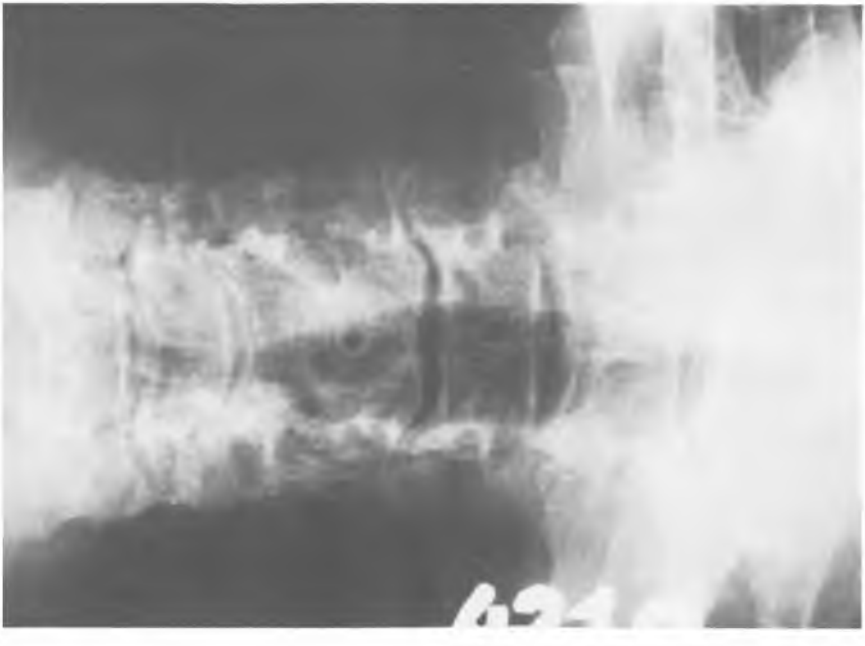

Fig. 4. AP roentgenogram of the cervical spine with post-operative spondylodesis by the Cloward's method