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PERCUTANEOUS VERTEBROPLASTY FOR TRAUMATIC COMPRESSION FRACTURES OF THE CHEST-LUMBAR VERTEBRAE

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✓ ***Resume***

Treatment of traumatic spinal injury is an urgent problem in modern neurosurgery. The work is devoted to the surgical treatment of uncomplicated compression fractures (vTh10-L3) using the method of puncture vertebroplasty (PV). The results of treatment of 50 victims were analyzed. High efficiency and safety of puncture vertebroplasty was noted.

Key words: compression fractures of the vertebral bodies, mini-invasion spinal neurosurgery, and percutaneous vertebroplasty

ПЕРКУТАННАЯ ВЕРТЕБРОПЛАСТИКА ПРИ ТРАВМАТИЧЕСКИХ КОМПРЕССИОННЫХ ПЕРЕЛОМАХ ГРУДНО-ПОЯСНИЧНЫХ ПОЗВОНКОВ

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✓ ***Резюме***

Лечение травматического повреждения позвоночника является актуальной проблемой современной нейрохирургии. Работа посвящена лечению неосложненных компрессионных переломов позвонков на нижней грудном и верхне-поясничном уровне (vTh10-L3) с использованием метода пункционной вертебропластики (ПВ). Проанализированы результаты лечения 50 пострадавших. Отмечена высокая эффективность и безопасность пункционной вертебропластики.

Ключевые слова: **компрессионные переломы позвонков, мини инвазивная спинальная нейрохирургия, пункционная вертебропластика.**

УМУРТҚА ПОҒОНАСИНИНГ КЎКРАК-БЕЛ СОҲАСИ СИҚИЛИБ СИНИШЛАРИДА ПЕРКУТАН ВЕРТЕБРОПЛАСТИКА УСУЛИНИ ҚЎЛЛАШ

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✓ ***Резюме***

Бел кўкрак умуртқа поғонасининг (vTh10-L3) травматик шикастланишини даволаш замонавий нейрохирургияда долзарб муаммо бўлиб келмоқда. Мазкур мақола пункцион вертебропластика (ПВ) усули ёрдамида умуртқа поғонасининг асоратланмаган компрессион синишларни даволашга бағишланган. 50 та беморнинг даволаш натижалари таҳлил қилинди. Пункцион вертебропластика усулининг юқори самарадорлиги ва хавфсизлиги қайд этилди.

Калит сўзлар: умуртқанинг компрессион синишлари, миниинвазив спинал нейрохирургия, пункцион вертебропластика.

Relevance

The problem of treating uncomplicated compression fractures of the vertebral bodies is relevant and in demand in modern vertebrology. At present, the arsenal of methods for conservative treatment of traumatic "simple" compression fractures of the vertebral bodies includes the use of non-steroidal anti-inflammatory drugs, drugs that stimulate bone tissue repair and metabolic processes in it, a protective regime for the period of fracture consolidation (12-14 weeks), the use of special reclinators and corset belts that facilitate fracture consolidation.

The duration of consolidation of vertebral compression fractures is, as a rule, at least 3 months. In addition, prolonged immobilization impairs the quality of life of patients.

Treatment with immobilization and the use of external orthopedic devices (bracing) is recommended for patients with vTh10-L4 vertebrae fractures without concomitant neurological changes or severe instability. Although the treatment tactics for progressive deformity, neurological dysfunction, and pain are often nonsurgical, some authors are critical of this.

The amount of surgical intervention in patients with spinal trauma depends on many conditions, first of all, the type of spinal injury, the condition of the spinal cord and its roots, and the level of damage.

The approaches to treating patients with “simple” compression fractures of the vertebral bodies in the absence of neurological symptoms are different: from the installation of transpeduncular stabilization systems using the posterior approach to more aggressive treatment methods - corpectomy followed by stabilization with metal implants using the anterior approaches.

The tactics of treating such patients are being discussed, since open interventions are quite traumatic, and conservative treatment requires long-term immobilization.

In 1987, there were changes in the tactics of managing patients with pathology of the vertebral bodies due to the development by neurosurgeon P. Galibert and neuroradiologist H. Deramond of a new method called puncture vertebroplasty (PT). Application of the PV method allows increasing the strength, rigidity and loading capacity of the damaged vertebra.

PV implementation in the acute period of trauma allows consolidating the damaged vertebra, preventing the progression of compression and instability, and avoiding neurological disorders. PV provides early activation of patients, a quick return to normal life. J. Anderson (2001) and A. Camprell (2001) emphasize that the use of PV in traumatic injury is still not sufficiently developed and requires further improvement, especially with regard to the timing of the intervention.

Objective: to improve the results of treatment of patients with uncomplicated vertebral body fractures at the lower thoracic and lumbar spine levels using the method of percutaneous vertebroplasty.

Material and methods

For the period 2019-2020 We have treated 50 victims with traumatic fractures of heifers at the lower thoracic and upper lumbar levels (vTh10-L3). Among them there were 34 men (68%), women - 16 (32%), aged 20 to 69 years (average age - 41.0 ± 9.7 years). The duration of the treatment period of patients - 23 (87.5%) ranged from 1 to 7 days, 2 (7.7%) patients applied within the first day, 1 (3.8%) - after 7 days.

Traumatic fracture of the vertebral body in 27 cases occurred as a result of a road traffic accident, in 23 - catatrauma. All the victims were hospitalized in the neurosurgical department, before the PV were on strict bed rest. All patients had “simple” compression fractures without damage to the posterior longitudinal ligament, epidural dissemination of fragments, and neurological symptoms. After a thorough examination, no other possible causes of vertebral fracture (osteoporosis, presence of primary or secondary tumors) were identified.

Radiography of the spine was performed in all patients; however, it often did not give a complete picture of the extent of the injury and the nature of the fracture, therefore, it did not allow choosing the optimal treatment tactics. Spondylography is also insufficiently informative in detecting compression of the spinal cord by bone fragments of bodies or vertebral arches, although we consider it an obligatory diagnostic procedure for traumatic injury, since it allows an objective assessment of the state of bone structures.

All victims underwent computed tomography (CT) and magnetic resonance imaging (MRI) tomography. CT allowed the most accurate assessment of the condition of not only the bone tissue of the vertebrae, but also the expediency of PT. With its help, it is possible to detail the fracture (we): to establish the level, the number of damaged vertebrae, to

identify fractures of arches, articular processes, vertebral bodies, to determine the length of the fracture lines. In "simple" compression fractures of the vertebral bodies, cracks within the cancellous tissue were revealed. In this case, the contour of the vertebral body in all cases was not changed, the integrity of other bone structures was not violated.

Particular attention was paid to the presence of cracks in the posterior wall of the vertebral body, since such changes may be the cause of epidural outflow of bone cement during PT. The closing plates with a simple compression fracture were deformed with the formation of Schmorl's traumatic hernias. If cracks were found that went beyond the cortical substance, which was evidence of the presence of a multi-splinter fracture of the vertebral bodies, PV was not used.

MRI was used to establish compression of the epidural space. The deformity of the vertebral body and the condition of the bone tissue were assessed. Possible displacement of the vertebral axis in relation to one another, compression of the spinal cord and its roots, deformation of the spinal canal and posterior bone structures, fractures of the arches, damage to the musculoskeletal system, which are well defined by MRI, were assessed on sagittal sections. Particular attention was paid to the condition of the posterior longitudinal ligament, which determines the stability of the injury, the involvement of the intervertebral disc with the possible formation of a traumatic disc herniation, and the presence of an epidural hematoma.

The indication for the intervention was the presence of a compression fracture of the vertebral bodies of the I-II degree without concomitant damage to the articular-capsular apparatus and the prescription of the fracture no more than 3 months, the absence of neurological symptoms.

Contraindications to PT were: the presence of unstable compression fractures of the vertebral bodies, concomitant trauma with damage to internal organs, traumatic spinal injury with deformity of the spinal canal and compression of the spinal cord and its roots, traumatic injury with concomitant fracture of the posterior semicircle, damage to the musculoskeletal system, bone fragments in the spinal canal with its deformation, partial or , complete blockage of the cerebrospinal fluid, decompensation of the patient's somatic status"explosion" of a compression fracture of the vertebral body; comminuted or multi-comminuted compression fracture of the vertebral bodies.

The degree of fracture was assessed by compression or wedge-shaped deformity of the vertebral bodies: I degree - the height of the vertebral body or its anterior sections was reduced by less than 1/2 was noted in 27, II degree - by 1/2 of the initial - in 14, III degree - more than 1/2 of the original in 9 patients.

Result and discussion

The patients were divided into 2 groups. The 1st group included patients who underwent vertebroplasty from 2 sides - 27 (54.00%) patients and the 2nd group: patients underwent vertebroplasty from one side - 23 (46%). The effectiveness of treatment was assessed by the degree of regression of pain and muscle reflex syndromes and X-ray control data.

In the postoperative period, during X-ray (spondylogram, MSCT) studies in the 1st group, the effect of eliminating kyphotic deformity with restoration of the height of the fractured vertebra body is more than 90% and regression of pain syndrome according to the assessment of pain on a visual analogue scale below 3 points was noted in 20 (74.1%) observations. Whereas, the analysis of the results of the performed vertebroplasty in the patients of the 2nd group, the regression of pain syndrome according to the visual analogue scale is below 3 points and the radiological confirmation of the effect of normalization of the axis and height of the fractured vertebral body was noted satisfactory in 13 (56.52%) cases.

Findings

Thus, performing vertebroplasty for uncomplicated compression fractures of the thoracolumbar vertebrae can significantly restore the height of the fractured vertebra body (from 5 to 10%, on average by 7.5%), normalize the vertical axis of the spine, and eliminate the factor causing pain. Bilateral implementation made it possible to achieve stable stabilization of the anterior supporting column of the spine, as well as early activation of this category of patients.

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