USE AND EFFICIENCY OF THE COMBINED TRANSPLANT FOR TRAUMATIC INJURIES OF THE BODIES OF THE CERVICAL VERTEBRES

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ANNOTATION

The authors have developed and applied in clinical practice a combined graft consisting of autologous bone and bone cement. The effectiveness of the combined graft as a plastic material for injuries of the cervical vertebral bodies was studied.

Key words: injury, spine, combined graft.

I. INTRODUCTION

The urgency of the problem. Traumatic injuries of the spinal column refer to severe types of injuries of the musculoskeletal system, requiring long-term hospital and rehabilitation treatment. Among all skeletal injuries, according to the literature, they account for up to 17.7% [2,3,5]. In the structure of general injuries, these injuries account for 3.3%, and disability as a result occurs, according to the literature, in 87-100% of cases [2,3,4,6,8,11,12].

Among the spinal cord injuries received as a result of road accidents, they reach 65.0%, with a fall - 53.0%, with diving - 97.0% [4,5,12,13]. According to some authors, up to 85.0% of injuries occur in the lower cervical (CIII-CVII) spine (NSP) [1,2,5,7].

Radiological research methods play the main role in the diagnosis of traumatic injuries of the spine and spinal cord: radiography, computed tomography (CT) and magnetic resonance imaging (MRI).

In 45-60% of cases, injuries of the spinal cord with injuries of the cervical spine are accompanied by gross neurological disorders in the form of tetraplegia, impaired sensitivity and function of the pelvic organs. Therefore, inadequate and late diagnosis of closed NSP trauma leads to a delay in the required treatment and contributes to the deterioration of the neurological status [6,9,11,12,13].

Treatment of spinal injuries is an urgent medical problem that requires further improvement. The currently existing methods of surgical fixation for fractures of the cervical vertebral bodies have at least one main drawback - the lack of primary stabilization. This means that even after a successful operation, additional immobilization is required - the patient has to wear a corset for several months.

In order to eliminate this drawback, a number of authors recommend the tactics of combining the method - interbody fusion with various grafts with transpedicular or screw-rod osteosynthesis [2,4,6,7,10]. Used independently transpedicular or screw-and-rod osteosynthesis does not create a sufficiently strong fixation of the spinal motion segment (VMS). Often within 2-4 months. after transpedicular osteosynthesis, bone resorption occurs around the screws and the loss of the achieved deformity correction occurs [2,4,6], and interbody fusion can be called quite stable, only after the formation of a single bone block. Despite the presence of numerous publications, the development of implants that stabilize metal structures, this issue remains a controversial problem. In addition, the question of choosing a suitable plastic material, metal graft, time and method of surgery to stabilize the spine still remains.
In the literature available to us, we have not seen the use of a combined graft (autologous bone + bone cement) to stabilize the vertebral segment in case of injuries of the cervical spine.

The aim of our study is to improve the results of surgical treatment for traumatic injuries of the cervical vertebral bodies using a combined graft to stabilize the injured vertebral segment.

Material and research methods. In the neurosurgical department of the SF RSCEMP were and were treated 63 patients with damage to the cervical vertebrae. Of these, 47 (74.6%) patients were male and 16 (25.4%) were female. Of the total number of victims, 39 (61.9%) patients were injured in a car accident, 17 (27.0%) patients - when falling from a height and 7 (11.1%) patients - when performing heavy physical labor. In most cases, 51 (80.9%) patients were delivered by ambulance teams or a passing car to the emergency department and, after a neurosurgeon's examination, were admitted to the hospital. The rest (19.1%) patients were transferred from regional hospitals through the air ambulance. The hospitalization time of patients ranged from 4 to 72 hours from the moment of injury.

In the admission department, all patients underwent X-ray and multispiral computed tomography (MSCT) studies. On radiographs and MSCT, in 29 (46.1%) patients, an unstable fracture of the CVI vertebral body was revealed, in 16 (25.4%) patients, a fracture of the CV vertebral body, in 13 (20.6%) patients - CIV and the remaining 5 (7.9%) of patients with a body fracture - CVII vertebra.

The fractures were unstable, the patients needed surgery. All patients belonged to group D according to the Frankel scale - at admission there were moderate or severe neurological disorders in the form of paresis and paralysis, a decrease in sensitivity below the level of damage with stool and urination retention. We have developed a combined graft for corporodesis of the damaged body of the cervical vertebrae, consisting of autologous bone and bone cement. A combined graft is prepared prior to placement on the vertebral bone defect. The bone is taken from the wing of the ilium or fibula of the patient himself, depending on the size of the removed body of the cervical vertebra. To do this, along the middle of the autologous bone, a hole is made with a drill or electric drill, then the latter is filled with bone cement. After hardening of the bone cement inside the graft, it is placed on the bone defect. The combined graft holds more load than autologous bone, thus it has a positive effect on the regeneration of bone tissue for the formation of a single solid bone block in the area of corporodesis.

All patients with injuries of the cervical vertebral bodies underwent anterior decompression of the spinal cord and stabilization of the spinal segment with a combined graft. After the operation, he underwent external rigid fixation of the neck with Shants' collar. All patients underwent control X-ray and MSCT examinations in dynamics. In the postoperative period, the patients were prescribed symptomatic conservative treatment (vascular, nootropics, antioxidants, vitamins, decongestants) and underwent a course of preventive measures against secondary infection and pressure ulcers.

Research results. The obtained clinical and neurological data in these patients showed that during the observation period - after surgical and conservative treatment, 36 (57.2%) patients had moderate positive neurological symptoms, sensitivity appeared or increased below the level of damage, an improvement in the motor sphere in the distal parts of the limbs.

Control X-ray and MSCT data carried out in dynamics showed that in these patients the combined graft was held firmly, stabilization in the operated vertebral segment was good. After being discharged from the hospital, almost all patients received rehabilitation treatment at the regional rehabilitation center several times during the year. Conducted 8 months after surgery, X-ray and MSCT in the area of corporodesis with a combined graft formed a single and strong bone block.

But, despite the complex therapeutic measures taken, 19 (30.2%) patients showed no positive neurological improvements, and 8 (12.7%) patients could not be saved. Their causes of death were secondary complications in the form of respiratory and cardiovascular failure.

We give a clinical example: Patient O-v, 22 years old. Received a severe complicated closed injury of the cervical spine in a car accident. The patient was taken by a passing car from the scene to the district hospital, where first aid was provided. He was put on a Schantz neck brace. X-ray of the cervical vertebrae revealed a compression comminuted unstable fracture of the body of the CV vertebra. 8 hours after the injury, the patient
was taken to the neurosurgical department of the SF RSCEMP through the air ambulance from the regional hospital. On admission, the general condition of the patient was grave. Consciousness is clear. Breathing is abdominal. In the neurological status, there was an upper peripheral paraparesis, lower paraplegia and dysfunction of the pelvic organs by the type of delay. There was a violation of all types of sensitivity below the level of CVII. Immediately after admission, the patient underwent MSCT of the cervical spine (Fig. 1) and the diagnosis was made: Severe closed vertebrospinal trauma: Closed compression comminuted unstable fracture of the CV vertebral body with displacement of bone fragments into the spinal canal. Contusion and partial compression of the spinal cord. Spinal shock. Tetrasyndrome. Dysfunction of the pelvic organs by the type of delay.

After appropriate preparation, the patient was operated on under endotracheal anesthesia. Anterior decompression of the spinal cord was performed with the removal of the damaged body of the CV vertebra together with the torn intervertebral discs by the left antero-lateral approach. Conducted corporodesis with combined transplantate. After the operation, the neck was fixed with an external rigid Schanz collar. The next day after the operation, a control MSCT of the cervical spine was performed (Fig-2). The stabilization of the operated spinal segment was good. The autograft is held tightly.

The patient was prescribed symptomatic conservative treatment and a set of measures against inflammatory complications and pressure ulcers. Prescribed drugs that improve microcirculation (reopolyglucin, pentoxifylline), antibacterial drugs, vitamins. Upon admission to the neuroreanimation department, the patient was injected with 500 mg of solmedrol (methylprednisolone) intravenously, then after the operation, 30 mg / kg was injected intravenously for 15 minutes, after 45 minutes - intravenously dropwise during the day (according to the scheme).

In order to prevent pulmonary infection during the treatment period, breathing exercises, chest massage and transfer of the patient every 2-4 hours were performed. The patient was repeatedly underwent lumbar puncture with endolumbar administration of a nootropic-ozone mixture.

After the surgical and conservative treatment, the patient's condition improved. The patient was discharged after 15 days in a compensated state. Within a month after the operation, the patient showed a slight improvement in neurological symptoms in the form of an improvement in sensitivity and an increase in the range of motion in the distal regions.

Minor movements were noted in the toes. The postoperative wound in all cases healed by primary intention without complications.

Thus, a combined graft consisting of autologous bone and bone cement was developed and used to stabilize the vertebral segment in case of injuries of the cervical vertebral bodies, and the results of surgical treatment were evaluated taking into account the results of clinical neurological and radiological parameters.
II. CONCLUSIONS:

1. The use of a combined graft for corporodesis in case of injuries of the cervical vertebral bodies is a physiological and effective method of treatment. When using a combined graft in the cervical spine, there is no need for additional fixation with a metal structure.

2. X-ray and MSCT data carried out 8 months after the operation showed that a single and strong bone block was formed in all surviving patients in the area of corporodesis with a combined graft.

3. Additional external fixation with a Shants corset of the cervical spine after corporodesis with a combined graft in case of injuries of the cervical vertebral bodies, contributes to the early rehabilitation of the victims.

4. The combined graft as a plastic material is not inferior to other plastic materials of both biological and non-biological nature.

5. Timely decompression of the spinal cord and reliable corporodesis with a combined graft significantly improves neurological parameters and reduces the incidence of secondary inflammatory complications and pressure ulcers.

BIBLIOGRAPHY