



THE RESULTS OF THE TREATMENT OF COMPRESSION FRACTURES OF THE THORACIC AND LUMBAR REGIONS IN ELDERLY AND STARTING PATIENTS USING AN INDIVIDUAL DIFFERENTIATED SURGICAL METHOD

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Article history:	Abstract:
Received: June 10 th 2022 Accepted: July 10 th 2022 Published: August 11 th 2022	The examination was attended by 102 patients over the age of 45 who had compression fractures in chest and lumbar spine during 2012-2021 years in neurosurgery departments of Neurosurgery and vertebrology departments of the clinic of Andijan State Medical Institute, the Republican emergency ambulance scientific center Andijan branch, as well as the Republican specialized Neurosurgery scientific and practical Center spinal surgery departments.

Keywords: Compression Fractures, Surgical Method, Minimally Invasive Methods.

INTRODUCTIONS. Diagnosis of the stage and nature of damage to the spinal cord and spine is one of the urgent problems of modern vertebrology and neurosurgery. Spinal injuries are in second place after injuries of the lower extremities and account for 10-26% of injuries of the osteoarticular system [5].

Vertebral fractures are not visible on conventional radiographs in 23-57% of cases. The emergence of more informative methods of radiation diagnostics (multispiral computed tomography - MSCT, magnetic resonance imaging - MRI) naturally increases the visualization of the stage and nature of the damage to the spinal cord and spine [1,2,3].

When treating patients with compression fractures in the region of the thoracic and lumbar vertebrae, orthopedic and neurosurgical problems must be excluded before the doctors. Over the past 20 years, significant progress has been made in the surgical treatment of this type of injury. This is explained by the development and application of such methods as vertebroplasty, **TPF** and kyphoplasty in the treatment of compression fractures of the spine [4].

Compression fractures of the spine in adults and the elderly are one of the most common diseases. In the USA, 25% of postmenopausal women will experience at least one spinal compression fracture during their lifetime. Spinal fractures are observed in 40% of people who have reached the age of 80. According to Russian authors, every third woman and every eighth man over 65 have at least one spinal fracture. Chronic low back pain is associated with a decrease in working capacity, functional activity and quality of life [1].

Surgical treatment of compression fractures is widely used for rapid, significant and persistent relief of spinal

pain, which leads to increased physical and daily activity and improved quality of life [7]. Posterior fixation - transpedicular, hinge-laminar and combined systems [6, 10], anterior fixation - implant-based fusion, vertebral body arthroplasty, anterior plates [2,4,8], vertebral body augmentation with cement [7,9], etc. used.

The choice of the method of fixation of the spine in compression fractures of the thoracic and lumbar spine in elderly and senile patients, the choice of the access route, the assessment of the extent of the operation in the presence of concomitant pathology, in the case of low mineral density of the vertebral body, and in the case of spinal instability syndrome, still remain open to discuss the reasons.

In the literature of the Russian language, in the reviews devoted to the given problems, D.S. Bobrova (2009), L.Yu. DarchiaL.Yu. (2011), D.I.Stadler (2011), A.I. Norkinas (2013) defined specificity in the fixation of the spine by both maternal and miniinvasive methods in the treatment of compression fractures of the spine in young and older patients by surgical method. The possibilities of using a combination of different minimally invasive methods and indications for the use of different minimally invasive methods in individual clinical cases have not been studied in the studies conducted.

In conclusion, the clinical diagnosis of compression fractures of the thoracic and lumbar vertebrae in older patients, the cause of the occurrence of compression fractures and the choice of a differentiated surgical method depending on their degree, is the cause of controversy among neurosurgeons, traumatologists and vertebrologists



THE PURPOSE OF THE STUDY: to develop individual differentiated surgical methods based on methods for examining compression fractures of the thoracic and lumbar spine in elderly patients and to prevent possible complications.

MATERIAL AND METHODS OF RESEARCH.In the Departments of Neurosurgery and vertebrology of the clinic of Andijan State Medical Institute, the Republican Scientific Center for emergency ambulance Andijan Branch Department of Neurosurgery and the Republican specialized scientific and practical center of Neurosurgery in the Departments of spinal surgery 2012 – 2021 years of compression fractures in the field of the chest and lumbar spine formed 102 patients over the age 45, of these, 48 patients with inpatient treatment up to 2012-2018 years formed the control group and the main group of 54 patients with inpatient treatment up to 2019-2021 years. 52 (51%) of these patients were women and 50 (49%) men. The age of the patients was 71 (69.6%) 50-59 years old, 28 (27.5%) 60-74 years old, 3 (2.9%) over 75 years old. Compression fractures were observed in 11 (9.8%) patients in the VTh5-VTh10 region, in 87 (77.7%) patients in the VTh11-VL2 region, and in 14 (12.5%) patients in the VL3-VL5 region. Complex instrumental examination methods were used after varying degrees of damage or pain in the thoracic and lumbar vertebrae.

X-ray examination in 2 different projections was performed in 6 (5.9%) patients, MSCT — 38 (37.3%), MRI — 47 (46.1%), CT — 11 (10.8%). On examination, attention was paid to the area of the compression fracture, the mineral density of the vertebral body at the site of the compression fracture, the nature of the fracture (stable or unstable), and the presence of vertebro-medullary conflict at the site where the compression fracture occurred.

When choosing a surgical method in patients with compression fractures, particular importance was attached to the cause of the compression fracture and the nature of the damage to the supporting columns of the spine. The main essence of the surgical treatment of compression fractures of the spine is to decompress the spinal cord, restore the normal shape of the spine and stabilize the damaged segments.

RESULT AND DISCUSSION: In the conducted scientific study, we chose the method of surgical treatment of compression fractures in the region of the thoracic and lumbar vertebrae, based on the AOSpine classification introduced into practice in 2013. The

AOSpine classification (The AO Spine Thoracolumbar Spine Injury Classification System) made it possible to standardize treatment tactics for spinal cord injuries, taking into account the advantages and disadvantages of classification systems previously used by the authors. . The most extreme of this classification is based on two classifications, in 1994 year F. Magerl and co-authors proposed AO / Magerl and in 2005 year A.R. Vaccaro it is based on the TLISS classifications offered by and co-founders.

As a result of the examination, compression fractures in the region of the thoracic and lumbar vertebrae were revealed in 102 patients older than 45 years. Compression fractures occurred predominantly in the VL1 region in 35 (34.3%) patients and in the VTh12 region in 19 (18.6%) patients. Analysis of the results of complex radiological research methods showed that changes in the axis of the spine, displacements and dislocations of the vertebral bodies, signs of compression in the vertebral bodies, in some cases, changes in the shadow of the paravertebral soft tissues are detected during a conventional x-ray examination in 2 projections.

Normal bone density is 1.0 or more according to the T-score and 133.0 ± 37.6 according to the Hounsfield unit. In osteopenia, the T-score is from -1.0 to -2.5 and the Hounsfield unit is 100.8 ± 24.5 ; in osteoporosis, the T-score is less than -2.5 and the Hounsfield unit is 78.5 ± 32.4 . Currently, there are few densitometric examinations in the regions of our republic, but there are CT examinations. Therefore, we used more CT examination to determine the mineral density of the compressed vertebral body.

MSCT examination provides an opportunity to obtain more information than X-ray examination. Compared to X-ray examination, MSCT allows more accurate characterization of compression fractures: it is possible to determine the degree of deformation, the number of damaged vertebrae, fracture of the arches, the mineral density of the body of the compressed vertebrae, and the presence of signs of instability of vertebrae with compression fractures. A normal regonological study does not show displacement of bone fragments into the spinal canal, and the reason for this is the occlusion of the arches of the spine, detected by MSCT.

An MRI study of the soft tissues of the spine can detect the following contents: ligaments, intervertebral disc, spinal cord and its changes (ischemia, edema, hemorrhage and cyst), extradural and intradural hemorrhages, changes in the vertebral body. Comprehensive examination methods (X-ray examination, densitometry or MSCT examination, CT



and MRI) performed for compression fractures in the region of the thoracic and lumbar vertebrae make it possible to accurately diagnose patients with the disease (clearly see the area of the disease, know the stage of the disease, know the cause of the disease) and makes it possible to choose a differentiated surgical method of treatment.

To determine the mineral density of the compressed vertebral body, a quantitative CT-study was used. MSCT revealed the presence of instability syndrome in damaged segments. The presence of vertebro-medullary conflict in the area of compression was determined using CT or MRI studies. The types of operations performed in the control and main groups are presented in tables 1-2.

Table 1
Operations conducted in the main group

Nº	Type of operation	Number of patients	%
1	Percutaneous vertebroplasty	16	29,6
2	Posterior spondylodesis (TPF)	19	35,2
3	Posterior spondylodesis (decompressive laminectomy+ TPF)	13	24,1
4	Combined method (vertebroplasty+ TPF)	4	7,4
5	KRITO migration (complication)	2	3,7
	Total	54	100

Table 2
Operations conducted in the control group

Nº	Type of operation	Number of patients	%
1	Percutaneous vertebroplasty	4	8,3
2	Posterior spondylodesis (TPF)	10	20,8
3	Posterior spondylodesis (KRITO)	11	22,9
4	Posterior spondylodesis (decompressive laminectomy+ TPF)	17	35,4
5	ТПФ migration	3	6,3
6	KRITO migration	3	6,3
	Total	48	100

Postoperative complications in the control and main groups are presented in Table 3

Table 3
Complications after the transferred operation

Nº	Complications that occur	Main group	Control group	Total
1	ТПФ migration	-	3	3
2	KRITO migration	2	3	5
3	Re-compression fracture occurrence	-	3	3
4	Preservation of pain syndrome on account of Vertebro-medullary conflict	-	2	2
	Total	2	11	13

Surgical treatment of compression fractures in the region of the thoracic and lumbar vertebrae in elderly and senile patients depends on the degree of deformation of the compressed vertebral body, the presence or absence of instability syndrome in the damaged segment, the mineral density of the compressed vertebral body, and the nature of the vertebro-medullary conflict in the spinal canal in the area of the compressed body. During the investigation, individual differentiated surgical methods of treatment were developed based on the results of X-ray, MSKT, CT and MRI examinations of compression fractures in the thoracic and lumbar regions in elderly and elderly patients. Nº DGU 10312 of 01.28.2021 «Algorithm of treatment of compression fractures of the thoracic and lumbar vertebrae of elderly patients with a differentiated surgical method».

In 2 out of 54 patients who made up the main group, KRITO migration was observed and eliminated surgically after examination of the posterior fusion. Vertebroplasty was performed in 16 of the patients who did not have a vertebroplasty in the channel in the area of the body where the compression fracture occurred, the height of the body subjected to compression was not 50% lower than the height of the normal vertebral body, there was no development of a fracture in the damaged area, and the compression. The TPF device was installed in 19 patients with a 50% reduction in the height of the compressed vertebral body, instability syndrome in the affected segment, but no vertebro-dural impingement. Decompressive laminectomy and TPF device were installed during the operation when the height of the



compressed vertebral body was 50% below the norm, the presence of instability syndrome in the damaged segment, and the presence of vertebro-medullary conflict.

The combined method (vertebroplasty + TPF) was used in 4 patients with compression of the vertebral body height by 50% below normal, instability syndrome in the damaged segment, and mineral density of the vertebral body below normal.

During the examination, the pain syndrome in patients before surgery according to the VAS scale in the control group was 6.89 ± 1.0 , after surgery - 2.96 ± 0.85 . In the main group, the intensity of the pain syndrome on the VAS scale before surgery was 6.64 ± 1.13 , after surgery - 1.98 ± 0.69 .

Before and after surgery in the control group, according to the Oswestry scale, a decrease in symptoms (0-20%) was observed in 31 (64.4%) patients, a moderate decrease in symptoms (20-40%) - in 17 (35.6%) patients. In the main group, a decrease in symptoms (0-20%) was observed in 50 (95.6%) patients and a moderate decrease in symptoms (20-40%) in 4 (4.4%) patients.

The results of the operation were evaluated on the Macnab scale, excellent results were obtained in 23 (46.7%) patients, good - in 11 (24.4%) and satisfactory - in 13 (28.8%) patients of the control group. In the main group, excellent results were obtained in 42 (80.0%) patients, good - in 12 (20.0%). From the obtained results, it can be seen that there were no complications from the surgical method chosen on the basis of the developed algorithm.

CONCLUSIONS:

1. In case of compression fractures in the region of the thoracic and lumbar vertebrae, it is advisable to conduct complex examination methods using two-projection radiography, MSCT, CT and MRI. With incomplete use of examination methods, sufficient information about the state of the spine and spinal cord will not be obtained.

2. Comprehensive x-ray examination of compression fractures of the thoracic and lumbar spine in adults and elderly patients makes it possible to quickly eliminate problems in the diagnosis of the disease, timely select a differentiated treatment method for each patient, and predict possible complications after injury.

3. In the surgical treatment of compression fractures of the thoracic and lumbar regions in adults and elderly patients, it is advisable to choose according to the degree of deformation of the compressed vertebral

body, the presence or absence of signs of instability in the damaged segment, the presence or absence of vertebro-medullary conflict in the spinal canal.

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