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STATE OF THE ART IN THE TREATMENT OF EXTRADURAL SPINAL TUMORS

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Abstract.
Introduction. Timely diagnosis of tumors of the thoracic spine at an early stage of the disease creates conditions for the choice of adequate tactics of surgical treatment with the preservation of vital anatomical structures.
The purpose of the study: to analyze the results of surgical treatment of extradural tumors of the thoracic spine, depending on the choice of surgical treatment tactics.
Materials and methods. The material of the study are patients with extradural tumors of the thoracic spine aged 10 to 50 years who were treated at the Republican Specialized Scientific and Practical Medical Center of Neurosurgery in the period 2019-2021. The following methods were used in the investigation: clinical neurological, X-ray, MRI, MSCT studies, scintigraphic research. Methods of surgical intervention:
1. Laminectomy with removal of an extradural tumor of the thoracic spine without stabilization of the vertebral-motor segment
2. Laminectomy with removal of an extradural tumor of the thoracic spine with stabilization of the vertebral-motor segment
All patients were divided into 2 groups:
1. The main group, patients underwent removal of an extradural tumor of the thoracic spine with stabilization of the spine (stabilizing);
2. Control group, patients underwent removal of an extradural tumor of the thoracic spine without spinal stabilization (decompressive).
We used the following scales: determination of the general condition of patients according to the Karnovsky scale, the pain intensity scale (Dennis, 1989), the scale of motor and sensory functions according to Frankel (1992), assessment of sensitivity disorders.
Results. In the surgical treatment of tumors of the thoracic spine, we applied 2 main types of interventions: stabilizing and decompressive operations. In decompression-stabilizing operations, posterior-median access is very convenient in terms of decompression and removal of the tumor.
Conclusion. Indications for surgical treatment of extradural spinal cord tumors were the presence of intense pain syndrome, compression of the spinal cord, progressive neurological disorders, gross instability of the spinal-motor segment. The best results were noted in the group of patients who underwent spinal-motor segment stabilization.

Keywords: extradural tumors of the spinal cord, surgical treatment, outcome.

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INTRODUCTION

Tumors of the thoracic spine are complexly located tumors, as they tend to grow both towards the spinal canal and into the chest cavity. The importance of diagnosing tumors of this localization at an early stage of the disease creates conditions for choosing the tactics of surgical treatment while preserving vital anatomical structures. Despite the improvement of diagnostic options in the detection of diseases of the spine and spinal cord, in neurosurgical practice to this day there are many cases of tumor lesions of the thoracic vertebrae with severe neurological disorders. At the same time, cases of tumor germination in the spinal canal and in the chest cavity in the form of an "hourglass" are revealed. Treatment of this contingent of patients requires major surgical interventions with tumor evacuation from the spinal canal and chest cavity.

Of great importance is the nature of the origin of the oncoprocess in the thoracic vertebrae.

According to world statistics on the spread of spinal cancer, 85-88% of spinal tumors are metastatic tumors. The treatment of this category of patients has its own complexity and is focused on improving the quality of the rest of life. The main clinical symptom (84%) of tumor lesions of the thoracic vertebrae is pain in the spine. And in a number of cases, pain relief is not possible with medication and requires surgical intervention, from percutaneous vertebroplasty to radical vertebrectomy.

The aim of the work was to analyze the performed operations to study the surgical tactics, features of approaches and techniques for removing extradural tumors of the spinal cord, as well as the results of their surgical treatment.

MATERIALS AND METHODS

. The material of the study are patients with extradural tumors of the thoracic spine aged 10 to 50 years who were treated at the Republican Specialized Scientific and Practical Medical Center of Neurosurgery in the period 2019-2021. The following methods were used in the investigation: clinical neurological, X-ray, MRI, MSCT studies, scintigraphic research.

Methods of surgical intervention:

1. Laminectomy with removal of an extradural tumor of the thoracic spine without stabilization of the vertebral-motor segment

2. Laminectomy with removal of an extradural tumor of the thoracic spine with stabilization of the vertebral-motor segment

All patients were divided into 2 groups:

1. The main group, patients underwent removal of an extradural tumor of the thoracic spine with stabilization of the spine (stabilizing);

2. Control group, patients underwent removal of an extradural tumor of the thoracic spine without spinal stabilization (decompressive).

We used the following scales: determination of the general condition of patients according to the Karnovsky scale, the pain intensity scale (Dennis, 1989), the scale of motor and sensory functions according to Frankel (1992), assessment of sensitivity disorders.

In the control group, there were 12 men (54.5%), 10 women (45.5%). In the main group, there were 16 (57.1%) men and 12 (42.9%) women (Table 1).

Table 1.

Dividing of patients by gender in the main and control groups

Gender	Main group		Control group	
Men	16	57,1%	12	54,5%
Women	12	42,9%	10	45,5%
Total	28	100%	22	100%

In the course of the analysis of tumor distribution zones along the spine, it was found that extradural tumors of the spinal cord were located in the thoracic region in 50 cases.

To describe the localization of the tumor, we used the surgical classification of spinal tumors by Tomita (2001).

In the neurological status at the time of surgery, motor and sensory disorders were noted in 25 (50%) patients, dysfunction of the pelvic organs - in 16 (32%), pain syndrome - in 9 (18%). The diagnosis was established using the surgical classification of spinal tumors according to Tomita, computed tomography, magnetic resonance tomography; if metastases were suspected, scintigraphy was used.

RESULTS

In the surgical treatment of tumors of the thoracic spine, we used 2 main types of interventions: stabilization and decompressive surgeries (table 2).

Table 2.

Types of surgical interventions in patients according to Tomita classification (1997).

Surgery types	Tomita classification				Number	%
	type 1	type 2	type 3	type 4,5,6,7		
decom-pressive	5	12	0	0	17	34 %
stabiliza-tion	33	0	0	0	33	66 %

Of the 50 (100%) patients operated on by the open method, in 38 (86.4%) cases, a posterior median approach (laminectomy) was used, if necessary, which was supplemented by stabilization (decompression-stabilization).

The posterior-median approach was most preferable for the purpose of palliative surgery for metastases, it allowed decompression in the spinal canal with a “muff-like” growth of the tumor, which made it possible to maximally remove the tumor from 2 sides. The posterior median approach was used at all levels of the spinal column. It should be noted that this approach was effective in cases of extensive tumor involvement of the spine (mainly hemilaminectomy at several levels).

Histological characteristics of tumor biopsies are done in table 3.

Table 3.

Histological analyses of tumor biopsies

Tumor type	Group A	Group B	Group C	Group D	Group E
Benign	1	1	6	2	1
Malig-nant	3	5	18	3	2
Meta-static	1	2	2	2	1
total:	5	8	26	7	4

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The disadvantage of this approach is the decrease in the support ability of the spine with bilateral removal of the articular processes. In patients in the first group with benign tumors, posterolateral access was used in 28 (56%) cases.

In the second group, this method was used in 22 (44%) patients. In decompressive-stabilizing operations, the posterior median approach is very convenient in terms of decompression and removal of the tumor. The anterior approach is convenient for pathological fractures in the cervical spine. The use of an anterior approach at the level of the thoracic and lumbar vertebrae is the most traumatic, since there is a need to displace the internal organs and this is fraught with a number of possible complications.

Comparative analysis of the results of surgical treatment in patients of the main and control groups is done in table 4.

Table 4.

Comparative analysis of the results of surgical treatment in patients of the main and control groups

		1 group		2 group	
		N.	%	N.	%
before surgery	Movement disorders	4	79,9 ±3,3	5	74,0 ±4,4
	Sensory disturbance	10	81,2 ±3,2	5	82,0 ±3,9
	Pain syndrome	4	91,9 ±2,2	4	90,0 ±3,0
after operation	Movement disorders	2	12,1 ±2,7	2	25,0 ±4,4
	Sensory disturbance	6	16,1 ±3,0	4	22,0 ±4,2
	Pain syndrome	2	12,1 ±2,7	2	24,0 ±4,3

CONCLUSION

1. Neurological deficit with the development of paresis, paralysis, as well as impaired pelvic organ function was observed in 91% of patients. The most severe neurological disorders were observed in patients with primary malignant tumors (26%) and in patients with metastatic lesions (29%).

2. Radiography, MSCT, MRI and scintigraphy have a significant role in the diagnosis of spinal tumors, which make it possible to determine the presence of extradural tumors of the thoracic spine and choose an adequate surgical intervention.

3. Indications for surgical treatment of extradural tumors are the presence of intense pain syndrome, compression of the spinal cord, progressive neurological disorders, gross instability of the spinal-motor segment.

4. The best results were noted in the group of patients who underwent spinal-motor segment stabilization operations.

CONFLICT OF INTEREST, FINANCING & COMPLIANCE WITH PATIENT RIGHTS AND PRINCIPLES OF BIOETHICS

The author declares no conflict of interest. The study was performed without external funding. All patients gave written informed consent to participate in the study.

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