

THE PRIORITY OF VERTEBROPLASTY FOR TREATMENT OF SYMPTOMATIC VERTEBRAL HEMANGIOMAS

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Abstract: Objective. *To analyze results of surgery for symptomatic and aggressive vertebral hemangioma, which is rare in clinical practice.*

Material and Methods. *The study included 82 patients having symptomatic vertebral hemangioma with local pain syndrome as a main clinical manifestation. Diagnosis of vertebral hemangioma was confirmed by neurovisualization findings in all cases. Patients were operated on by use of percutaneous unilateral transpedicular vertebroplasty.*

Results. *All patients had a regression of pain syndrome, increase in physical activity, and return to their usual mode of life after surgery. In 45 patients pain was arrested at the first day after operation, and in 37 patients — in five days. The follow-up period after percutaneous vertebroplasty was 6 to 12 months.*

Conclusion. *Percutaneous vertebroplasty when correctly indicated and perfectly performed is effective and minimally invasive method of treatment for symptomatic and aggressive vertebral hemangioma.*

Keywords: *Symptomatic and aggressive vertebral hemangioma, percutaneous vertebroplasty.*

Hemangioma is a congenital malformation with a benign vascular tumor process. In 75% of cases hemangiomas are localized in the spine. Vertebral hemangiomas (VH) emissions constitute 2-3 % of all spinal tumors and occur in 10-12 % of cases in the population [2,3,14,28].

The aim of our research is the analysis of results of treatment of symptomatic and aggressive VH by the method of puncture vertebroplasty.

Material and methods: In the National Center of Rehabilitation and Prosthesis of Disabled people in 2013 -2014. method puncture vertebroplasty operated on 82 patients (45 men and handeni) with symptomatic VH. The patients were aged 26 to 72 years (mean age 41.2 years). In all the analyzed cases of PG were isolated and localized only to one vertebrae. None of the patients in the PG group was not associated with systemic or genetic diseases.

All patients had local pain syndrome without neurological symptoms and encouraged to consult a neurologist or neurosurgeon.

All patients had a pronounced persistent character of the pain, which is aggravated in the upright position, with tilt, swivel and during the movement. The average duration of pain prior to surgery was 3.8 years (range 1.3 to 8 years). Patients taking prescription painkillers, which in most cases prevent pain for a short time. In addition, 14 patients showed a significant reduction in motor activity.

Patients had classical clinical and instrumental examination, including spondylography, CT, and MRI.

Spondylography allowed to determine the typical pattern of a lesion of a vertebral body hemangioma in the form of vertical strips or a honeycomb. None of the patients was diagnosed compression fracture of the affected VH vertebral body.

CT was estimated by changes in the spongy tissue of the vertebra and the volume and nature of the lesion of the structures of the vertebra, invasion of the spinal canal. On axial sections of the affected vertebra had a typical picture. In the postoperative period in several patients CT was performed on 2-5th day, which allowed to identify structural changes of VH's, complete filling of the affected vertebra with cement, and the presence of leakage of the cement into the canal or the paravertebral space (Fig. 1).

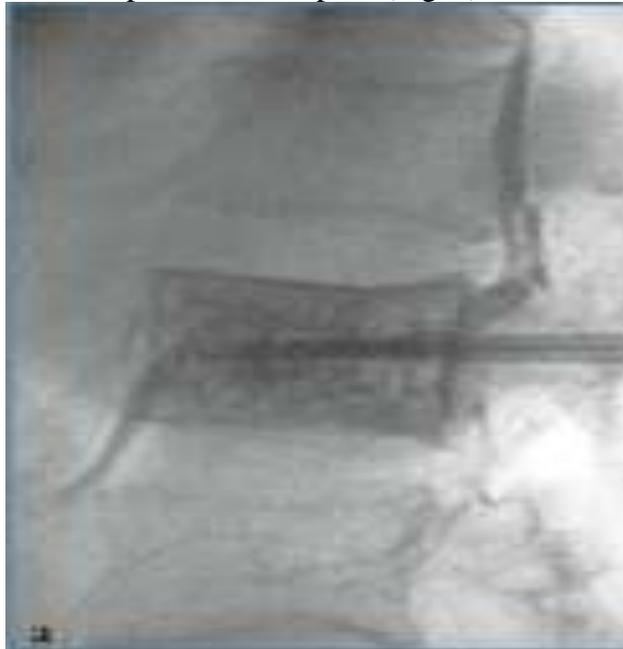


Fig. – 1. The stages of entry of bone cement in the affected vertebra bodies VL2 aggressive hemangioma.

MRI revealed a change in the signal intensity of the affected vertebra and the condition of the nervous structures. Hyperintense signal in T1 - and T2-modes for MRI in four patients indicated the absence of the aggressive nature of VH and hyperintense signals in T1 mode and intense accumulation of contrast in the other four patients confirmed the aggressive nature of VH (Fig. 2). Thus, MRI study determined the level of proliferative potential (high or low) VH and to identify them in a group of symptomatic or aggressive formations.



Fig. - 2. MRI picture of an aggressive hemangioma at the level of VL2.

Indications for the puncture vertebroplasty served severe pain resistant to analgesics; the presence of VH bodies and posterior structures of the vertebrae with high proliferative capacity without compression of neural structures.

The purpose of the puncture vertebroplasty in symptomatic and aggressive VH: prevention of progressive growth of VH with possible invasion into the spinal canal with compression of nerve structures; prevention of pathologic compression fracture with subsequent kyphotic deformity of the spine; increases in strength and stabilization of the affected segment with prevention of scoliotic deformation.

Thus, the criteria for selection of patients for carrying out the puncture vertebroplasty was considered persistent severe pain, no neurological deficit and confirmation of VH methods of neurovisualisation. Patients with compression of the spinal cord and its roots exposed to surgical decompression followed by reconstruction of the vertebral body are excluded from the analyzed group. The contraindications to puncture vertebroplasty served serious diseases of the cardiovascular and respiratory systems, coagulopathy, intolerance to acrylic resins and the local infectious process.

82 procedures performed puncture vertebroplasty unilateral transpedicular access. The level of intervention matches the level of the lesion. All interventions were performed in patients position laying on the stomach under local anesthesia with fluoroscopic control With arcs. Puncture of the affected vertebral bodies was done under Benito needle, bone cement based on acrylic resins, solvent. Biopsy was not performed. The needle position was verified radiographically in direct and lateral projections. Standard considered the location of the end of the needle at the border of anterior and middle thirds of the vertebral body in lateral projection. Cement with a syringe, Benito was injected under fluoroscopic control until the beginning of the polymerization in a minute after mixing with the solvent. The flow of cement and the filling structures of the affected vertebra was controlled using a lateral projection of the C-arc (Fig. 3). The amount of cement in the affected vertebra has an average of 5.11 ml (from up to 5,67 4,03 ml). During and after the introduction of cement both needles were left in place in order to prevent the expiration of cement from the site of puncture and epidural hematoma. In all cases prophylactic used antibiotics.

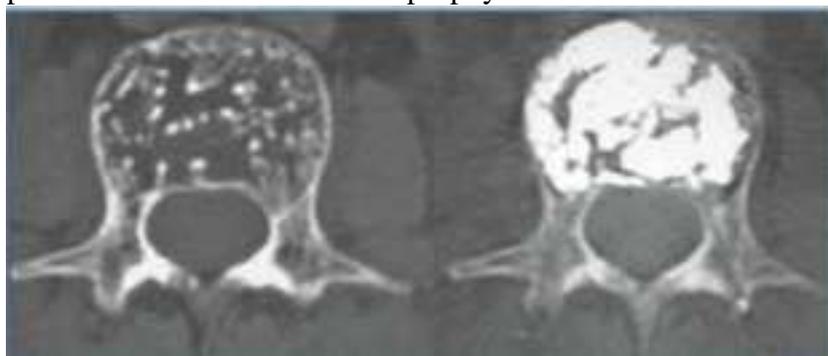


Fig. - 3. Aggressive hemangioma VL3, before and after surgery.

The position of the patient lying on his stomach has not changed in 10-15 min after puncture vertebroplasty. The operation time was 30-40 min. for 3-5 days after surgery, some patients underwent a control CT study. Stay patients the hospital was 24-72 h (average 36 h). Post-operative condition was assessed 24 h, 1 week, 6 months., and subsequently once a year.

Results and discussion: The first mention of VH dated 1867, and in 1926. Perman was the first radiological description GHG [2,3]. VH usually have no clinical manifestations and are discovered accidentally during CT or MRI of the spine. However, in rare cases VH's are aggressive in nature, manifesting symptoms resistant to medication pain and neurological

deficit [2,3,6,7,10,14,19,21,22,28]. This occurs in cases of diffuse lesions of vertebrae, pathologic fracture of his body, as well as due to the penetration of the tumor into the spinal canal with compression of nerve structures [7,21,28]. In such cases, the treatment choice is a complex problem for patient and surgeon. Conventional treatments are symptomatic VH radiation therapy and surgery aimed at decompression of neural structures with subsequent reconstruction of the vertebral body. These methods do not give lasting therapeutic effect and are associated with high rates of complications and recurrences [2,22,28]. Despite the technique of preoperative intra-arterial embolization of VH and (or) puncture of the introduction in it of ethyl alcohol, surgery symptomatic PG is accompanied by a high level of surgical aggression and the blood loss from the tumor [2,4,14,18,19,20,29]. Now appeared the possibility of an alternative symptomatic treatment of VH's by the method of puncture vertebroplasty plastics. First puncture of the introduction of cement based on acrylic resin with a persistent positive effect of the French neurosurgeons Galibert and Deramond in 1984 for the treatment of VH is symptomatic of the second cervical vertebra [2,11,12]. Currently this method minimally invasive surgery is successfully used by many neurosurgical centers of the world, which allows in most cases to avoid open surgical treatment and radiation therapy in patients with symptomatic VH [2,5,8,9,11,12,13,15,16,23,25,27].

All patients analyzed in the groups after the operation marked regression of pain syndrome, increase physical activity and return to normal life. In 45 patients the pain stopped on the first day after surgery, 37 within five days, although in the first two days there was a significant increase of pain. Thus, all patients achieved a positive result, expressed in the absence of pain, in rejection of analgesics and full social rehabilitation. The observation time after puncture vertebroplasty ranged from 6 to 12 months. (average 9 months). In addition, after the puncture vertebroplasty patients was not required further treatment including radiation therapy, intra-arterial embolization of GHGs, the puncture needle injection of ethanol or surgical intervention.

In the analyzed series of indications for the puncture vertebroplasty was based on clinical manifestations and radiological data. All patients had prolonged pain resistant to analgesics. The pain was localized in the site of the lesion vertebra and caused the decrease of physical activity. According to some authors, pain is caused by the phenomenon of angiogenic thrombosis, ischemia in the form of a steal syndrome, as well as tension of the anterior and posterior longitudinal ligaments due to the expansion of the vertebra of the cavernous component of the tumor [6,11,20]. 31 of the 82 patients had evidence of aggressive VH. When evaluating neuroimaging methods (spondylography, CT, MRI) revealed that one patient VH was localized in T4, hit all the vertebral body and spread to legs and back arc; PG 31 patients wore diffuse common with thinning of the cortical bone of the vertebra and the defeat of its posterior. In addition, these patients had gipointensivnoy signal in T1-MRI mode, which, according to Cross et al., VH can be attributed to the aggressive group [10,17,26].

In professional literature there are reports about the use of unilateral transpedicular access when carrying out the puncture vertebroplasty [1,2,25]. Thus, Kim et al.[25] recommend the use of unilateral pedicle access needle in a vertebroplasty. The number of complications and recurrences in a series of Kim et al. higher than that of other authors [2,6,9,12,25]. In our work, unilateral transpedicular access when symptomatic VH contributes to a higher degree of filling of posterior VH affected vertebra and avoids the use of additional therapies, as well as to prevent invasion of a tumor inside the spinal canal. Our view is consistent with data from professional literature [8,9]. After the cement in the epidural space we associate with a high degree of aggressiveness VH and having her epidural component.

The results of treatment by the method of puncture vertebroplasty in the analyzed group is comparable to the results of a series Galibert et al. and a number of other authors [2,15].

Over a two-year observation period in all patients in this series was filled with cement to stabilize the vertebrae, there was no secondary deformities and pathological fractures of vertebral bodies.

In the postoperative period one patient was asymptomatic after the revealed cement in the epidural space without compressing the spinal cord. This complication did not require additional treatment and increased length of stay in the hospital. In this case, also obtained a positive effect from the puncture vertebroplasty with regression of pain syndrome and improvement of quality of life. Even one patient for four days after surgery, remained pain at the puncture site not requiring the use of analgesics. Infectious, hemorrhagic and embolic complications in the analyzed series of patients are not marked. Low rate of complications when using puncture vertebroplasty noted by many researchers [1, 2, 8, 9, 11, 16, 24,].

Conclusion:

1. Percutaneous vertebroplasty is a safe and effective minimally invasive treatment symptomatic and aggressive VH, which allows to eliminate pain.
2. Percutaneous vertebroplasty to restore lost strength and stability of the affected vertebra and prevent compression of the nervous structures in the future.
3. The use of a C-arm in the puncture vertebroplasty increases the safety of this method.

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