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ROBOTIC ASSISTANCE IN SPINAL NEUROSURGERY

Karomov Suhrob Mirmuhsinovich

Asian International University

Tel : +998934500601

karomovsuhrob@gmail.com

ABSTRACT: Back pain is often the leading cause of activity limitation in people of working age and sharply reduces the quality of life in older patients. Studies show that from 60% to 80% of the population of industrially developed countries suffer from back pain of various origins [Burulin A.A., 1986, Jennifer L.K., Anne L.G., 1990, Kuznetsov V.F., 2004, Pedachenko E.G., Kushchaev S.V., 2004].

According to the results of the study of the epidemiology of pain syndromes in the adult population of Russia, the prevalence of chronic back pain is 42.4% - 56.7% [Pedachenko E.G., 2000, Shor Yu.M., 2009], and the annual incidence is 5% [Vein A.M., 2001, Habar S., Saifuddin A., 2002, Putilina M.B. et al., 2007]. Back pain most often bothers people of the most active social group aged 30-50 years [Vein A.M. et al., 2007]. According to L.Yu. According to Popelyansky (1989), labor losses in Russia associated with pain in the lumbar spine amount to 161 days per 100 workers, and morbidity with temporary disability is up to 23 cases per 100 workers [Dudaev A.K. et al., 2011, Putilina M.V. et al., 2007].

Currently, new technologies are being actively implemented in spinal neurosurgery, aimed at improving the quality of interventions, their minimal invasiveness. Robot-assisted surgical interventions are most widely used in the treatment of such pathologies as spondylolisthesis, degenerative stenosis of the spinal canal, when taking biopsy material, performing vertebroplasty. Robotic assistance allows, even at the preoperative stage, to calculate the most ideal trajectory of screw insertion based on computed tomography data and correct it, if necessary, at the intraoperative stage based on the data of combining preoperative CT images and an X-ray image taken during the operation. Due to this approach, the risk of intra- and postoperative complications is reduced. It is also important that this technique allows stabilizing the necessary levels transcutaneously.

The use of the Go-Lif minimally invasive stabilization system is impossible without the use of robotic assistance [Konovalov H.A., Shevelev I.N. et al.,2010]. Robotic assistance allows reducing the time of the operation, and therefore the time the patient spends in drug-induced sleep.

The development of robotic assistance will allow for safer and more effective performance of long, complex surgical interventions to stabilize the spine, vertebroplasty, and obtain biopsy material.

The aim of the study Evaluation of the capabilities of the Spine Assist Mazor robotic assistance method to improve the efficiency and safety of spine stabilization, vertebroplasty, and obtaining high-quality biopsies of spinal masses

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Scientific novelty.

The novelty of the work consists in the evaluation of a minimally invasive method that allows safe, effective, fast and with a lower degree of X-ray exposure to the patient and the operating team to perform surgical interventions on the spine and spinal neural structures for various pathologies of the spine and spinal nerve structures, as well as the use of new stabilizing systems for various pathologies of the spine:

1. The technique for performing surgical interventions using robotic assistance was applied and refined

2. Indications and contraindications for the use of transcutaneous transpedicular transdiscal stabilization Go-Lif with the help of robotic assistance were determined

3. The technique for obtaining biopsy material for spinal lesions with various volumetric formations with the help of robotic assistance was developed.

CONCLUSIONS

1. Using the Spine Assist Mazor robotic assistance method allows for performing minimally invasive interventions in stabilizing surgeries on the spine for degenerative diseases (stenosis of the spinal canal, spondylolisthesis), fractures of the vertebral bodies, lesions of the vertebral bodies by hemangiomas, space-occupying lesions.

2. Using the new Go-Lif stabilizing system, which is impossible without the use of the robotic assistance method

3. Using the robotic assistance method in a group of elderly patients with a somatically burdened anamnesis, which will allow for performing minimally invasive interventions in this group of patients

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