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Intraoperative ultrasound in spine surgery: Application in 50 cases of intradural tumors, infectious, traumatic and degenerative pathologies

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Background: Among intraoperative imaging methods, ultrasound is currently one of the most emerging. It is a versatile tool, inexpensive and free of ionizing radiation, which has proven useful in the surgical treatment of intradural tumors, vascular and degenerative pathologies, trauma and spinal infections. On the other hand, it is an operator-dependent method with a long learning curve. Research question and design: In this paper, we report our case studies relating to the use of intraoperative ultrasound in spinal surgery from 2022 to 2024.

Methods: The clinical and radiological data of the patients operated on were collected, for which the surgeon used intraoperative ultrasound. After carrying out the decompression, the operating field was filled with physiological solution and a small, sterile, convex probe was used. The device allowed precise real-time visualization of the dural sac, spinal cord and nerve roots, dentate ligaments and arachnoid septa, as well as bony components such as laminae, pedicles and vertebral bodies. Intervertebral discs, osteophytes, calcified hernias were also visualized. In some cases, vascular structures such as the vertebral artery and the anterior spinal artery were visualized.

Results: In the study period, intraoperative ultrasound was used in 50 patients. Among these, the most represented pathology was intradural tumors (31); meningiomas prevailed, followed by neuromas. US-guided procedures were carried out for infections (5 cervical epidural abscesses, both posterior and ventral), 6 cases of degenerative pathology, 3 arachnoid cysts, 2 Chiari malformations, 1 case of post-traumatic syringomyelia and 1 cervico-thoracic cord herniation.

Discussion: US has proven useful and effective in various contexts: in intradural tumors it has allowed to assess the laminectomy before proceeding with durotomy, and the completeness of the resection. Although it requires familiarity with a technique that is not common to spine surgeons, US has represented in our experience a valid tool.