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CLASSIFICATION OF NUEROHIRURGICAL OPERATIONS

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Annotation: The pathology of the spine includes a large number of diseases that range from degenerative pathology, in which herniated discs and lumbar canal stenosis stand out, as well as traumatic, deformative and tumor affectations. In most cases, the first manifestation of a vertebral involvement process is manifested by spinal pain.

Key words: pathology , spina, cranium, canal stenosis, lumbar spondyloarthriosis, canal stenosis

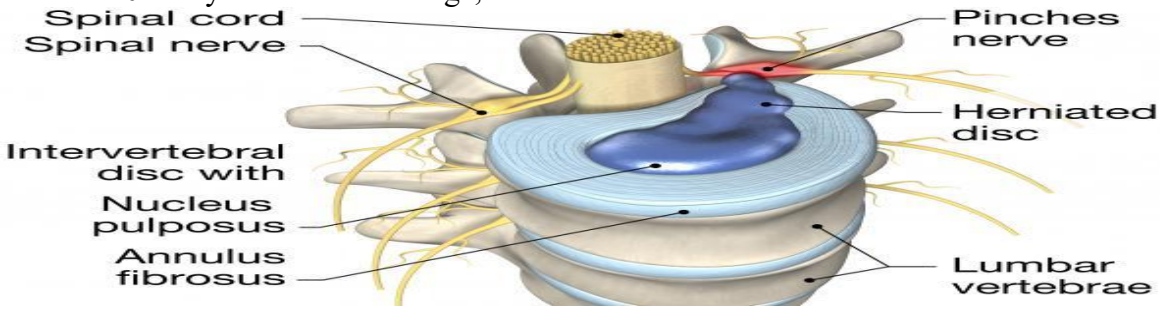
So much so that low back pain is the second most frequent reason for requesting medical evaluation in primary care after upper respiratory tract infections. Approximately between 70 and 85% of the western population develops an episode of low back pain throughout their lives, and low back pain is among the most frequent causes of disability, ahead of diabetes, depression, or health problems. cardiac. However, the pain caused in the lumbar spine can have a varied etiology, secondary to the complexity and variety of elements that make up the entire spine.

In most cases, the cause of back pain and lumbar pain is related to degenerative processes, but in 90% of cases there is no specific cause and only between 10-15% of pain cases. chronic low back pain present a diagnosis of certainty. In addition, there are multiple structures at the level of the spine that can be the origin of pain (intervertebral discs, articular facets, muscles, ligaments), but there are no diagnostic tests that indicate with certainty that these are the triggers of pain.

Of this 10% of patients who present a causal diagnosis of low back pain in primary care, it is estimated that 4% had a compression fracture, 3% a canal stenosis, 2% a visceral affectation not related to the lumbar spine, 0,7% a malignant tumor or metastatic process and 0,01% an infectious cause.

Within the processes of degenerative cause, which in turn are the most frequent include disc herniation, lumbar spondyloarthrosis, canal stenosis and spondylolisthesis.

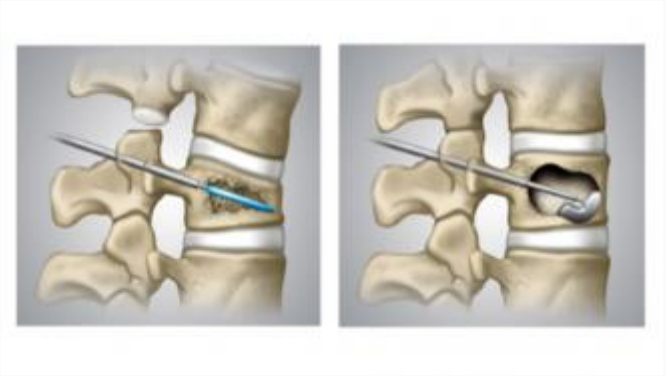
It is produced by the rupture of the fibrous ring that is part of the vertebral disc and the exit of the nucleus pulposus towards the medullary canal, producing compression of nervous structures. This can cause radiating pain to the lower limbs and require surgical treatment in some cases, although the initial treatment is usually with analgesia and rest. It is considered that the prevalence of this disease is found in 1-3% of the population, being more frequent between 20 and 40 years of age, and in men with a 2:1 ratio.



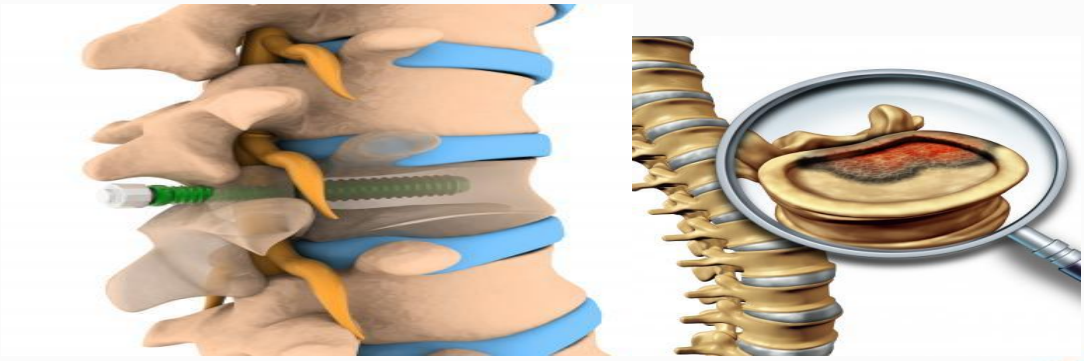
The incidence is estimated at around 2% per year and 95% are located in low lumbar levels between 25 and 55 years of age. Tobacco and physical exertion (among other causes) have been related to its onset, although it is suspected that there is an important genetic component that increases the susceptibility of certain people to suffering disc herniations.

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Our vertebral fractures These are injuries that are usually produced by high-energy impacts, but the appearance of fractures in elderly people is also frequent, mainly secondary to a process of osteoporosis. In the first case, the appearance of fractures is usually associated with a traffic accident or falls from a height, while in osteoporotic fractures they can appear with falls from the height of the patient or with forced gestures or even coughing. When a vertebral fracture occurs, the first symptom is usually the appearance of sudden sharp pain, although up to a third of patients may be asymptomatic. In high-energy lesions, these symptoms can be combined with radicular pain or neurological involvement, which implies greater severity. The treatment of these lesions is variable, and can be treated from a conservative point of view, through the use of a corset and analgesic or in certain cases of affectation of the stability of the spine, requiring surgery by fixation with screws. In general, fractures with associated neurological injury require management in the intensive care unit, and subsequent intensive rehabilitation. Sometimes, especially in low-energy and osteoporotic fractures that present a lot of pain, treatment by vertebroplasty consists of a minimally invasive surgery injecting cement into the fractured vertebra that allows pain control and helps in the stability of the spine.



La deformative pathology Deformity of the spine is a rare entity and can range from small deviations in spinal alignment that do not require treatment, to major deformities that can lead to respiratory complications and back problems. Scolisosis is a more frequent process in adolescents, however, occasionally a deviation of the spine produced by the normal degenerative process of the spine may occur, and scoliotic deformations may appear in elderly patients. Certain diseases such as arthritis or deposit diseases can also favor the appearance of deformative processes, being more frequent in the craniocervical junction. In these cases, the deformity can lead to back pain secondary to compression of nerve structures and stenosis in different segments of the spine, for which surgical treatment may be necessary, but evaluation for rehabilitation or complementary treatments directed by Pain Unit.



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La malformative pathology It occurs as a cause of alterations in the development and formation of the spine from birth. In general, it is a pathology that appears in children and that on many occasions can lead to scoliosis and severe deformities.

The vertebral tumors These are relatively frequent lesions, mainly due to the increased survival in patients with tumor lesions, since it has been observed that up to a third of patients with metastatic bone lesions have lesions at the vertebral level. That is why it is important to differentiate vertebral tumor lesions that originate from the vertebrae themselves, whose frequency is relatively low, around 2,5-8,5 per 100.000 inhabitants per year, and to differentiate it from metastatic lesions. produced by other tumors that is more frequent.

Within primary tumors, we can differentiate between benign lesions whose treatment depends on the characteristics of the tumor and the symptoms, and malignant tumors, whose treatment usually includes surgery with the aim of as wide a resection as possible, always trying to maintain stability. of the vertebral column, and with it the use of fixation systems with screws or substitutes for interbody bodies, which in most cases will have to be complemented with radiotherapy and chemotherapy treatments.

Metastases or secondary tumors are up to 40 times more common than all primary bone tumors combined. The most frequent metastases are those produced by breast cancer (30%), followed by lung (13%), renal cancer (12%), prostate cancer (7%) and thyroid cancer (5%). The main symptom in these cases consists of spinal pain or neurological deficit due to root involvement. In these cases, treatment may be more variable depending on the control of the primary tumor and usually includes other specialties such as radiotherapy and medical oncology.

In our hospital the Multidisciplinary Neuro-oncology Unit, in which we actively participate and which includes the different oncology, radiodiagnostic or pathological anatomy services, carries out an evaluation of each one of the cases with the aim of obtaining the best result for our patients. Besides, the column unit performs a multitude of interventions and has the best equipment to perform different approaches that include minimally invasive techniques, as well as complex approaches when necessary.

A tumor consists of an abnormal growth of cells that can have a malignant behavior, if they have an invasive behavior, or benign. The global incidence of these tumors represents 2% of all neoplasias. In recent decades there seems to have been an increase in its incidence, mainly due to increased life expectancy of patients and improvements in diagnostic capacity. Within central nervous system tumors we can differentiate between primary tumors, originated by cells or structures that are part of the nervous system, such as meningiomas or glioblastoma, and those that derive from other structures, called secondary tumors, mainly metastases.

It is currently estimated that the global incidence of primary tumors of the central nervous system is approximately 20 people per 100.000 inhabitants per year. Mortality from these tumors increases with age, such that in developed countries only 14% of patients diagnosed with central nervous system tumors have a survival of more than 10 years and only 1% of them are preventable.

Within the most frequent tumors of the central nervous system we can differentiate benign tumors, in which meningiomas stand out, and on the other hand, glioblastomas. Regarding spinal cord tumors, astrocytomas and ependymomas should be highlighted. The most common secondary tumors are metastases.

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These tumors present important differences with those of other locations in the body, since even benign tumors, growing in closed compartments where essential organs (the brain and spinal cord) are located, can threaten the life of the patient. On the other hand, even the most malignant tumors of the nervous system practically never progress with metastases in the rest of the body and it is the condition of the nervous system itself that is a risk for the patient.

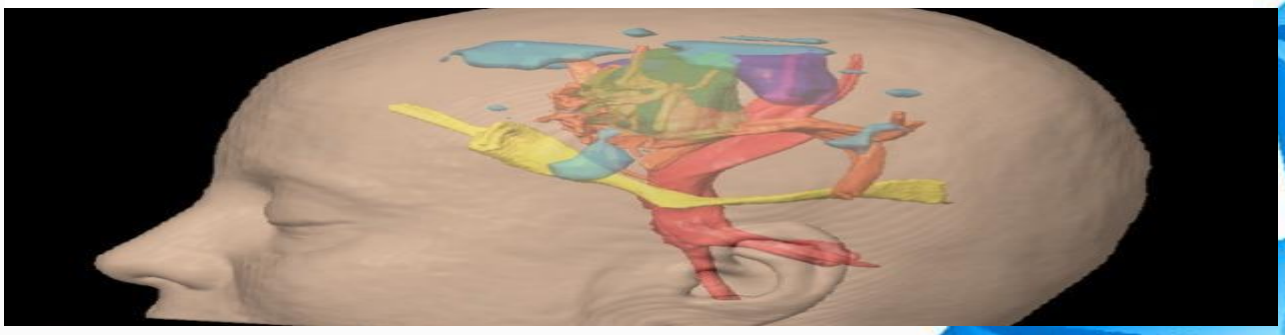
Definition and epidemiology

Meningiomas are tumors originated and formed by meningothelial cells that account for around 36,4% of intracranial tumors. They are typical tumors of adulthood, with a peak incidence in the sixth and seventh decades of life, although it has been observed that their appearance continues to increase with age. It has also been seen that its frequency is higher in women. Most of these tumors are attached to the dura mater and are more frequent in the parasagittal region, the convexity of the cerebellar hemispheres, the falx cerebri, the parasellar region, and the tentorium. There are different types of meningiomas, the most frequent being meningothelial meningioma, with benign characteristics and which are treated in most cases by surgery. In some rare cases, atypical meningiomas constitute a special entity of meningioma that can recur in up to 50% of cases and that, in addition to surgery, may require other treatments such as radiotherapy to prevent its recurrence.

Management and treatment

In the majority of patients with symptoms, the treatment of these lesions is mainly surgical, since it resolves the clinical picture, determines the histological grade of the lesion and will not require further treatment. However, on certain occasions or in locations that may increase morbidity, other treatments such as radiotherapy or radiosurgery may be the most indicated therapeutic option.

In Neurosurgery it is essential to establish an adequate balance between the best oncological result and the preservation of the patient's function, conditioned by the preservation of neural tissue with essential functions. This requires significant specialization and high technical complexity that allow both differentiating the limits between the tumor and the brain, as well as locating the neurological structures that must be preserved. Our service offers this specialization through the specific dedication of a team of professionals to this field, through super specialization. On an ongoing basis, Hospital 12 de Octubre has been equipped with the latest technologies in neuronavigation, surgical microscopy, intraoperative imaging and neuromonitoring, to meet the technical requirements in accordance with the best treatment standards.



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Current Neuroimaging studies make it possible to precisely locate the tumor in relation to the neural structures and, on many occasions, even make it possible to locate some neurological functions, thanks to functional MRI studies and tractography of brain connections. All these studies allow for preoperative surgical planning and can be incorporated into the neuronavigator, a guide that will also be used during surgery throughout the surgical procedure to guide the resection.

During resection, some tumors, particularly gliomas, may present poorly defined limits with the nervous system and the neuronavigator will lose part of its reliability due to the displacement that the tissues experience as the tumor resection progresses. For this reason, it is important to have intraoperative tools that help to assess the presence of tumor and the degree of resection in real time, and hence the use of surgical microscopes integrated with the neuronavigator, equipped with oncological fluorescence, and the assistance of intraoperative imaging techniques. they allow evaluating within their limitations the remains of tumor and their limits with the healthy brain. In our Center we have a high tech equipment, including microscopes equipped with fluorescence based on 5-aminolevulinic acid and fluorescein and intraoperative ultrasound equipment, integrated with the neuronavigator.



Despite the fact that preoperative functional studies can sometimes be incorporated into the neuronavigator, the displacement of the brain during surgery and the very limitation of these techniques in locating functional brain areas prevents the limit of resection in functional brain areas from being decided. based on these references. For this reason, there must be precise intraoperative tools that make it possible to safely define the limits of the essential brain areas that must be respected, so as not to worsen the patient's function. Localization of these areas during surgery is done by intraoperative neurophysiological monitoring or direct electrical stimulation of the brain during awake surgery. These techniques not only increase safety by identifying the areas to be preserved, but once they are located, the resection is increased as it is not necessary to leave wider resection margins.

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Since 2009 the Neuro-oncology Unit of our service is integrated into the Neuro-Oncology Multidisciplinary Unit, with weekly meetings, and a permanent committee of professionals whose purpose is to optimize the treatment and offer the best possible result for our patients.

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