

Information sheet 8: Meningioma

A meningioma is a tumour of the meninges which is the name given to the protective lining of the brain and spinal cord. It can occur in any part of the brain or spinal cord but the commonest sites are at the surface of the brain, either over the top or at the skull base. Meningiomas are almost always benign and do not spread. Malignant (cancerous) meningiomas are extremely rare. It is also possible, but rare to have more than one meningioma.

How often do meningiomas occur?

This is a rare condition. Meningiomas generally do not occur often, they affect around 1 per 38,000 people. However, they are one of the most common brain tumours, making up nearly 20% of all primary brain tumours. Their incidence increases with age, and they affect women more often than men. They are most commonly found in middle-aged or elderly women.

The majority of meningiomas (over 90%) are benign, but they still may recur after apparently complete surgical resection. Atypical and malignant meningiomas are more likely to recur.

What causes meningioma?

Like most brain tumours the cause of meningioma is unknown. In some people there may be an underlying genetic abnormality such as a mutation in a specific gene. Recent research has also shown a possible link between meningioma and hormone levels. Meningiomas frequently possess progesterone receptors and, less commonly, oestrogen receptors, which may explain their higher incidence in women.

What are the symptoms?

These can vary greatly, dependent on where the tumour is. Symptoms are caused by brain displacement or compression, not by invasion. However, these tumours can be so slow growing that they may go undetected for years. They can grow in and around cranial nerves that control function so that eyesight, taste, smell, sensation (numbness), swallowing or other movement may be affected. They may cause fits or muscle weakness. Sometimes sudden unexplained and/or recurrent severe headaches (which may be accompanied by nausea and/or vomiting) are the first symptom. Occasionally, an eye examination may reveal abnormalities, which lead on to further investigation and diagnosis.

Tests and investigations

In order to plan the correct treatment doctors need to get as much information as possible about the type, position and size of the tumour. Initially, a neurological examination will take place to assess any effect the tumour has had on the nervous system.

A CT scan (Computed Tomography) or MRI scan (Magnetic Resonance Imaging) will then be done to find the exact position and size of the tumour. MRI scans are the most widely used diagnostic tests since they are very effective in identifying even small meningiomas. The CT scan usually includes injection of a contrast (a short-acting dye) in order to determine the exact position and size of the tumour. An MRI scan is a specialised imaging technique that gives very clear pictures of the brain and will show the site and extent of the tumour. It usually takes 30-40 minutes and uses magnetism instead of x-rays. People with pacemakers cannot have this test and those with any other metallic implants should inform the doctor well before the test. Occasionally, an angiogram will be done, where dye is used in an x-ray to show up the blood vessels in the brain and their relationship with the meningioma. If the meningioma is in the spinal canal a spinal MRI scan may be done. This scans the spinal cord and takes about 20 to 30 minutes. Sometimes an EEG test (Electroencephalogram) may also be performed as a test that measures the electrical activity coming from the brain. It does not give pictures but instead tells a little about how the brain is functioning. It is useful in confirming seizures, if there is a clinical suspicion of epilepsy.

Treatment of meningioma

The treatment for meningioma depends on a number of factors including your general health, the size and position of the tumour and the rate of progression of the symptoms.

Surgery - Where possible, surgery is the first form of treatment for meningioma and in many cases the tumour can be removed completely. So far this has been the principal form of treatment for meningioma and it is still so in many circumstances. Surgical resection of meningiomas always has some risk, and growth or size of the meningioma or the progression of the symptoms should justify the risk.

For meningiomas located near the surface of the brain, surgery is often the best option. For meningiomas that are deep (cavernous sinus, medial sphenoid wing, parasellar, skull base and clivus), complete surgical removal may not be possible or it may involve too much risk to the cranial nerves or blood vessels. In addition, meningiomas sometimes recur, especially those that are atypical (on the borderline between benign and malignant). Radiation therapy may then be used to control their regrowth, whereas radiosurgery is increasingly used instead of surgery to control small meningiomas.

Radiation therapy – Conventional radiotherapy may be used after surgery if the meningioma cannot be totally removed, in order to destroy any remaining tumour cells. Radiosurgery has recently become a promising alternative to surgery in the treatment of surgically inaccessible meningiomas.

In SRT (stereotactic radiotherapy or radiosurgery) a highly focused radiation is given, which precisely targets the tumour with little impact on healthy brain tissue. Radiation is administered in multiple smaller treatments over a number of weeks (often 30 sessions given over six weeks). This allows the overall total dose to be higher than in standard radiation, because it allows normal brain tissue to recover better. It stops tumour growth in the vast majority of cases and in some people it may even cause the tumour to shrink. Each treatment is called a "fraction" therefore this type of therapy is sometimes called "fractionated" therapy. Fractionated stereotactic radiosurgery is often called FSR.

Radiosurgery can be given either with a gamma knife or a modified linear accelerator. Gamma knife radiosurgery is generally a single treatment planned and delivered all in one day, but fractionated radiosurgery using a linear accelerator has overtaken it, as it is safer.

Hormonal therapy and chemotherapy – These options have been tried in a small number of patients when meningiomas recurred despite surgery and/or radiotherapy. Hormonal therapy is based on the fact that many meningiomas contain receptors for hormones such as progesterone. Anti-progesterone drugs have been tried in a few clinical trials, but results thus far have been disappointing. The use of chemotherapy is limited by the fact that meningiomas are typically slow growing and therefore not very susceptible. These modes of treatment are still not proven and rarely used, especially when other treatment options are available.

Watch and wait – Do nothing, but monitor the tumour on a regular basis e.g. an annual MRI. This can be an option because meningiomas are slow growing and may be preferable if the tumour is not causing problems, particularly in older patients.

Brain Tumour UK acknowledges the help and support of Meningioma Association UK in producing this information sheet. www.meningiomauk.org

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