

How I Manage Supratentorial Meningiomas

Meningiomas comprise 15 – 20% of all symptomatic intracranial neoplasms. They are more common in women, where some are hormonally sensitive. Predisposing factors also include neurofibromatosis and radiation exposure, e.g. childhood leukaemias and in these cases, the tumours are likely to occur earlier, be multiple and behave in a more aggressive manner. However the vast majority of meningiomas are benign (WHO Grade 1); only 5% are atypical (Grade 2) and 1% malignant (Grade 3).

Presentation

Meningiomas may present with focal neurological deficits depending on their site of origin, or with seizures and it is unusual for the first presenting symptoms to be related to raised intracranial pressure. Tumours affecting the skull base may present with proptosis (see fig.1) or visual disturbance due to orbital involvement. Increasingly, meningiomas present as an incidental finding, discovered after a scan for an unrelated problem.

Investigations

The initial scan is often a CT, showing a homogeneously enhancing mass with a dural base and a variable degree of surrounding oedema (see fig.2). CT scanning can be useful in showing the degree of calcification of the tumour and delineating the bony anatomy, particularly in meningiomas of the skull base. MRI scanning gives more information regarding the three dimensional anatomy of the tumour and involvement of adjacent neuro-vascular structures (see fig.3), especially dural venous sinuses. In these cases angiography may help to define the involvement of major arteries and the patency of dural venous sinuses (see fig.4), and also allows embolisation of the tumour preoperatively in order to diminish operative blood loss.

Observation

A 'watch and wait' policy is often the most appropriate, particularly where the meningioma has been an incidental finding, as studies have shown that two thirds do not progress over time - although follow up periods were short in this study¹.

Some patients find the knowledge of their intracranial tumour too stressful and choose surgery. In older patients with no or minimal neurological deficits, who present with a single seizure, it may be appropriate to treat with anticonvulsants and to scan annually. Certain menin-

giomas, especially those of the central skull base, may appear alarmingly large on the scan while causing only minimal symptoms (see fig.5). For these, surgery carries not inconsiderable risks of morbidity and the tumour may progress very slowly. Hydroxyurea has been used to treat patients with those tumours deemed inoperable, but although results are encouraging, the numbers studied are small². Some patients choose conservative management initially and this is not unreasonable as long as the tumour has little surrounding oedema or mass effect.

Surgery

Surgery can offer a chance of cure as well as improvement in neurological deficits. However, there is a recurrence rate of approaching 10% even after seemingly complete excision. The rate of recurrence depends on the extent of tumour resection and the removal or coagulation of the associated dura (see table 1). Skull vault meningiomas are more easily removed completely than those of the skull base and recurrence rates reflect this.

In order to achieve total excision, surgery must completely expose the tumour and its dural origin with minimal brain retraction. The patient should be treated pre-operatively with Dexamethasone (16mg daily) and brain relaxation may be aided by Mannitol and drainage of cerebrospinal fluid.

In terms of the surgery itself, some advocate elective non-dominant frontal lobectomy for large olfactory groove meningiomas in order to avoid excessive brain retraction whilst skull base approaches e.g. orbito-frontozygomatic, aid access by decreasing the operative working distance. Early devascularisation of the tumour by obliteration of the feeding arteries is helpful, followed by internal decompression and extracapsular dissection to minimise damage to the surrounding brain. Early identification of cranial nerves and major arteries allows their preservation and if possible, no veins are sacrificed. Although it is said to be acceptable to sacrifice the anterior or third of the superior sagittal sinus, even in this region venous infarction may occur. Only if the sinus is completely occluded by collateral tumour, and there are therefore collateral venous drainage channels, may it be resected. Otherwise the tumour must be resected from the sinus dura as far as possible and its origin coagulated.

Follow Up

Follow up depends on the completeness of excision and the histology of the tumour. Benign tumours have a 5



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Figure 1. Hyperostotic meningioma of the left sphenoid wing causing proptosis.

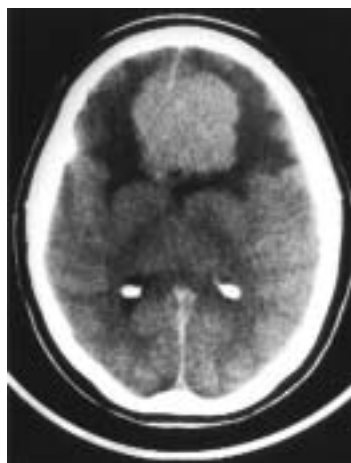


Figure 2. Post-contrast CT head scan showing a large enhancing falcine meningioma with considerable surrounding oedema in the frontal lobes.

year recurrence rate of 3% whereas that for atypical tumours is 38%, and anaplastic/malignant, 78%⁴. Malignant meningiomas should have adjuvant radiotherapy and this is probably also true for incompletely excised atypical meningiomas, although there is little conclusive evidence for this. For the rest, a baseline MRI scan should be followed by further annual scans, at least initially. Any sign of recurrence/progression is an indication for radiotherapy, either conventional or stereotactic radiotherapy. Both have shown control rates approaching 95%. 'Control' implies 'alive with disease' and this is certainly true of many patients with skull base meningiomas. Although most learn to live with the condition, it can be very stressful as recurrence can mean further surgery despite radiotherapy and an essentially benign tumour can still prove to be a fatal condition.



Figure 3. T2 weighted MRI scan showing a large left temporal fossa meningioma. Note the proximity of the proximal middle cerebral artery on the medial aspect of the tumour.

Table 1

Simpson grading and recurrence rate. ³		
Grade	Tumour Resection	Recurrence Rate
I	Macroscopically complete removal of dura, bone	9%
II	Macroscopically complete removal, dural coagulation	19%
III	Complete tumour resection, dura not coagulated	29%
IV	Partial removal	44%
V	Simple decompression	

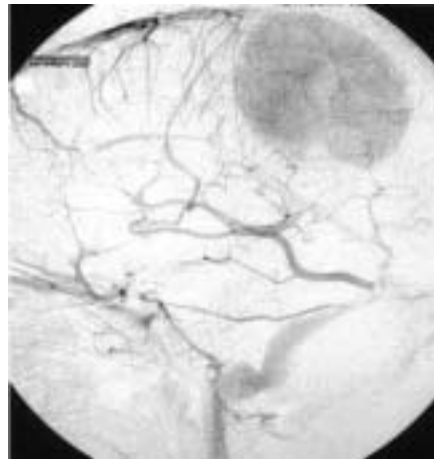


Figure 4. Venous phase of lateral carotid angiogram. The tumour blush from this large parasagittal meningioma is obvious. Obstruction of the superior sagittal sinus is recognised due to minimal distal flow. The venous drainage has been diverted via deep cerebral veins to the sigmoid sinus.

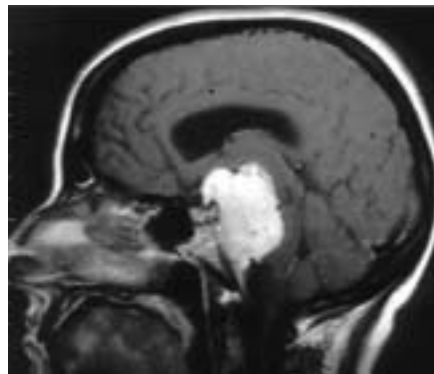


Figure 5. A very large petroclival meningioma causing severe compression of the brainstem.

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