Attempted Radical Removal of Parasagittal Meningioma: Risks and Benefits

Thesis

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✍. *Hisham Nofal*

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Abstract

BACKGROUND: Parasagittal (falcine) meningiomas invading the superior sagittal sinus (SSS) pose formidable obstacles to surgical management. Invasion is often considered a contraindication to surgery because of associated morbidity, such as cerebral venous thrombosis. The objective of this study was to evaluate the risk/benefit ratio in attempting radical excision of parasagittal meningiomas involving the superior sagittal sinus.

METHODS: The study consisted of 25 patients who had undergone surgery for parasagittal (falcine) meningioma. Patients with meningioma involving the anterior third of the sinus underwent radical removal. Patients with meningioma that was involving the middle and posterior third of the sinus had a radical removal if the sinus was completely obliterated, and subtotal removal of tumors that are infiltrating but not obliterating the SSS.

RESULTS: 23 patients (92%) had radical tumor resection achieving Simpson GI and 2 patients (8%) had subtotal tumor resection achieving Simpson GIV, both patients had stable disease with no tumor growth for the following 2 years of follow-up. There were 3 postoperative transient neurological deterioration (12%) and 2 postoperative deaths (8%). The recurrence rate in the study was 5%, with a follow-up for 24 months.

CONCLUSION: On the basis of our results, we conclude that if the sinus is obstructed, the portion of the sinus involved can be resected completely. If the sinus is partially occluded, less aggressive subtotal resections may be a reasonable choice. In both situations, extreme care is vital to preservation of bridging veins, which may offer important collateral drainage. With our approach, good results are achieved and it is not necessary to reconstruct the sinus.

Keywords: Meninges, Venous Sinuses, Meningiomas, Parasagittal Meningiomas.

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List of Abbreviations

Abb.	Full term
CSF	Cerebrospinal fluid
CT	Computed tomography
CXR	Chest X Ray
DSA	Digital subtraction angiography
EMA	Epithelial Membrane Antigen
fMRI	Functional MRI
GTR	Gross total resection
HRT	Hormone replacement therapy
MRI	Magnetic resonance imaging
MRV	Magnetic resonance venography
NF-2	Neurofibromatosis type 2
OC	Oral contraceptives
PSM	Parasagittal meningioma
SSS	Superior sagittal sinus
TB	Tuberculosis
WHO	World Health Organization

Introduction

The term parasagittal meningiomas (PSMs) applies to those tumors that fill the parasagittal angle, arise at the convexity of the hemisphere, just off the midline and adjacent to the SSS and falx, with no brain tissue between the tumor and the superior sagittal sinus (SSS).[1] Such tumors may invade partially or completely the superior sagittal sinus.[2-5] They comprise approximately 19.5 to 45% of all intracranial meningiomas.[6] They have different clinical and surgical significance, depending on their relation with the sagittal sinus.[1]

Parasagittal meningiomas are classified according to which third of the sinus they involve; as anterior third (from the crista galli to the coronal suture) which ranged from 15% to 42%, middle third (from the coronal to the lambdoid suture) which ranged from 37% to 70%, or posterior third (from the lambdoid suture to the torcular) which ranged from 9 % to 16.[1,5,7] And they are classified by Sindou according to what extent the superior sagittal sinus is affected that guide surgical decision making and preoperative planning.[8-12]

Most parasagittal meningiomas as well as falcine meningiomas gain a greater clinical and surgical relevance

due to their location close to the superior sagittal sinus, associated bridging veins and frequent closeness to eloquent areas, especially the tumors located in the posterior two-thirds of the superior sagittal sinus (SSS) may preclude their complete removal because of the relatively high mortality and morbidity.[13] In this case, the optimal surgical management is controversial; pose various challenges to neurosurgeons all over the world.[7,10,14-17]

The radical resection of the parasagittal meningiomas without complications is the goal of the neurosurgeon. Therefore, it is very important to preserve and/or repair the venous circulation. However, the high risk of damage to the cerebral venous system and the possibility of severe neurological complications make the surgical strategy debatable.[18,19] Unfortunately, because of the lack of published large series regarding parasagittal meningiomas invading the SSS, there are no definitive guidelines for the management of these complex cases.[14,19-20]

The advantages of a radical resection should be weighed against the potential additional risks related to the opening of the sinus and its wall resection.[1,21]

The anterior third of the sinus or a completely obliterated sinus can usually be resected with low