

# Tumor-to-tumor metastasis inside a meningioma

- [Breast Cancer Metastasis Developed Inside an Angiomatous Meningioma: A Case Report](#)
- [Intrameningioma metastasis: A case-based literature review](#)
- [Meningioma as the host for metastatic breast cancer: A rare occurrence with important therapeutic impact](#)

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There is a difference between [Tumor-to-tumor metastasis](#) and [collision tumors](#). The former implies a recipient role of the [host](#) tumor, and the latter refers to a co-localization of two different tumors that grow into one another, both being in the same organ. [Tumor-to-tumor brain metastasis](#) is a well-described phenomenon but with unclear [pathophysiology](#). Deeper knowledge could be beneficial for its management <sup>1)</sup>.

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A [tumor-to-tumor](#) metastasis inside a [meningioma](#) is a rare phenomenon. [Malignant neoplasms](#) of the [breast](#) and [lung](#) are the most common [primary tumors](#). Other sites of origin include [prostate](#), [renal](#) and [gastric](#) neoplasms. A [literature review](#) was conducted in March 2020 via [PubMed](#). Relevant search results were few <sup>2)</sup>

Since some metastatic tumors have [osteoblastic](#) imaging pattern, it is not always easy to differentiate them from meningioma on [preoperative](#) studies <sup>3)</sup>.

## Systematic review

Turner et al. located 124 [articles](#), describing 152 cases of patients with Tumor-to-tumor metastasis inside a meningioma. The mean ( $\pm$  SD) age of all patients was  $62.21 \pm 10.8$  years, with even distribution above and below the mean. Of the cases, 65.9% were reported in women. The most common cancer origins of TTMM were breast and [lung carcinoma](#), followed by kidney, prostate, and GI tract carcinoma. Cancer status is not a good marker of TTMM when managing a meningioma. In 36.69% of cases, TTMM was the presentation of an unknown [cancer](#). In nearly 60% of the known cases, cancer was considered in remission for at least 1 year. [Meningioma](#) parameters are unhelpful when considering a TTMM. The distribution of meningioma location is similar to other series of meningioma reported in the literature. Meningioma grade is similar to meningiomas without TTMM. In 57.89%, the patient presented with a focal deficit. Presenting factors were [seizures](#), elevated [ICP](#), and others. Over 95% of cases were [symptomatic](#) at presentation <sup>4)</sup>

## Case reports

A 73-year-old female patient diagnosed with breast cancer was found to have convexity meningioma. Since the size of tumor and peritumoral brain edema increased during follow-up period, the

meningioma was treated with surgical resection. Postoperatively, histopathologic examination confirmed metastasis of invasive ductal carcinoma within a secretory meningioma. The final diagnosis was TTM of breast cancer in meningioma. Here, we report a rare case of intra-meningioma metastasis and a review of literature to provide a better understanding of this rare phenomenon <sup>5)</sup>

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A 60-year-old female referred complaining about a progressive [headache](#), [nausea](#), and [vomiting](#) for the past month. She had a history of [breast cancer](#) treated with radical [mastectomy](#) (5 years ago) and [adjuvant chemotherapy](#) (until 1 year ago). Workups revealed a [dural](#)-based mass in the left temporobasal and midline subfrontal [regions](#). Histopathological study showed breast cancer metastasis nests within the primary meningioma

As the diagnosis of metastatic nests inside a [benign tumor](#), drastically alters [postoperative adjuvant treatments](#), a high index of suspicion is needed evaluating tumors from patients with a history of systemic neoplasms <sup>6)</sup>

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A 66-year-old [female](#), with known [Small-Cell Lung Cancer](#), who presented with left-sided [hemiparesis](#). The [Magnetic Resonance Imaging](#) scan revealed a right frontal [extraaxial](#) mass. The patient underwent a [craniotomy](#) and a [gross total resection](#) of the tumor. Histological examination of the excised mass revealed metastatic [adenocarcinoma](#) deposits inside a meningioma: [Tumor-to-tumor metastasis inside a meningioma](#). Reviewing the available [literature](#), it has been hypothesized that the following factors play a role in the [pathophysiology](#) of this phenomenon: [progesterone](#) and [estrogen receptors](#), cell-to-cell adhesion molecules, rich vascularization, favorable metabolic, micro-and immunological environment. Meningiomas seem to be the most common type of intracranial neoplasm to host a [metastasis](#). <sup>7)</sup>

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Two patients are reported, with breast and renal carcinoma metastases in an intracranial meningioma <sup>8)</sup>

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<sup>1)</sup> , <sup>2)</sup> , <sup>7)</sup>

Papadakis BK, Vorrias E, Bräutigam K, Chochlidakis N, Koutsopoulos A, Mavroudis D, Vakis A, Tsitsipanis C. Intrameningioma metastasis: A case-based literature review. J Clin Neurosci. 2021 Nov;93:168-173. doi: 10.1016/j.jocn.2021.08.028. Epub 2021 Sep 21. PMID: 34656242.

<sup>3)</sup> , <sup>6)</sup>

Hosseinzadeh M, Ketabchi SM, Ahmadi SA, Hendi K, Alimohamadi M. Meningioma as the host for metastatic breast cancer: A rare occurrence with important therapeutic impact. Surg Neurol Int. 2021 Jun 28;12:314. doi: 10.25259/SNI\_148\_2021. PMID: 34345455; PMCID: PMC8326081.

<sup>4)</sup>

Turner N, Kaye AH, Paldor I. Metastases to meningioma-review and meta-analysis. Acta Neurochir (Wien). 2021 Mar;163(3):699-709. doi: 10.1007/s00701-020-04661-7. Epub 2021 Jan 3. PMID: 33389125.

<sup>5)</sup>

Joe WH, Lee CY, Kim CH, Ko YS, Kim SP, Kwon SM. Breast Cancer to Meningioma: A Rare Case of Tumor-to-Tumor Metastasis. Brain Tumor Res Treat. 2023 Jan;11(1):73-78. doi:

10.14791/btrt.2022.0042. PMID: 36762811; PMCID: PMC9911711.

<sup>8)</sup>

Lanotte M, Benech F, Panciani PP, Cassoni P, Ducati A. Systemic cancer metastasis in a meningioma: report of two cases and review of the literature. Clin Neurol Neurosurg. 2009 Jan;111(1):87-93. doi: 10.1016/j.clineuro.2008.07.011. Epub 2008 Oct 19. PMID: 18930586.

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