

## Metastatic Colon Cancer in the Pituitary: A Case Report with Review of Literature

### Abstract

We report a rare case of metastatic colonic adenocarcinoma to the pituitary gland in a 58-year-old who presented with visual decline and panhypopituitarism. He underwent urgent transsphenoidal endoscopic surgery with significant improvement of his vision, followed by adjuvant fractionated radiotherapy to the resection cavity. He made a satisfactory recovery, but regrettably died from COVID-19 9 weeks after completion of radiotherapy. A multidisciplinary approach is essential for optimal management of this condition due to its rarity and complexity.

**Keywords:** *Colorectal cancer, metastasis, pituitary, transsphenoidal endoscopic surgery*

### Introduction

Metastases to the pituitary gland are very rare, only accounting for 1% of all pituitary tumor resections.<sup>[1]</sup> They are often a result of breast and lung malignancies<sup>[1,2]</sup> We report a rare case of a 58-year-old man who had progressive visual deterioration, secondary to a metastatic pituitary lesion from colon cancer. There are only five other reported cases, which also manifested with visual dysfunction requiring surgery, such as many metastases to the pituitary.<sup>[3]</sup>

### Case Report

A 58-year-old male with known sigmoid colon cancer with pulmonary and hepatic metastases, presented with worsening headaches and visual field defects. He was already under treatment with chemotherapy for the systemic metastases (capecitabine, oxaliplatin, and irinotecan) that were identified 1 year before his presentation. On recent imaging, the systemic disease was stable, with a prognosis deemed more than 6–12 months life expectancy and a performance status of 0. Magnetic resonance imaging (MRI) [Figure 1] revealed a heterogeneously enhancing sellar mass without significant sellar expansion. There was evidence of suprasellar extension in a dumbbell configuration causing compression of the optic chiasm.

The visual acuities were reduced (6/36 in either eye), the visual fields constricted bilaterally [Figure 2] and he was unable to read the Ishihara color vision plates with either eye. Assessment of his pituitary function demonstrated anterior hypopituitarism. There was no evidence of diabetes insipidus (DI).

Over a 7 day period, his vision deteriorated rapidly and he underwent an urgent transsphenoidal endoscopic resection of the pituitary tumor. Immediately before surgery, his visual acuity was reduced to finger counting. Intraoperatively, the lesion appeared firm, moderately hemorrhagic and was adherent to the surrounding dura and neurovascular structures. The bulk of the sellar and suprasellar tumor was resected and the optic chiasm was well decompressed. A Grade 2 cerebrospinal fluid fistula was repaired with an artificial dura (DuraGen) inlay to the bone and a pedicled nasoseptal flap. The procedure was uneventful and the patient recovered well with significant improvement to visual acuities (6/9 in either eye) and resolution of the visual field defects [Figure 3]. As expected, there was no reversal of the preoperative pituitary hormone deficits. The postoperative MRI showed significant reduction of the tumor volume [Figure 4]. Histological and immunohistochemistry analysis confirmed a metastatic colonic

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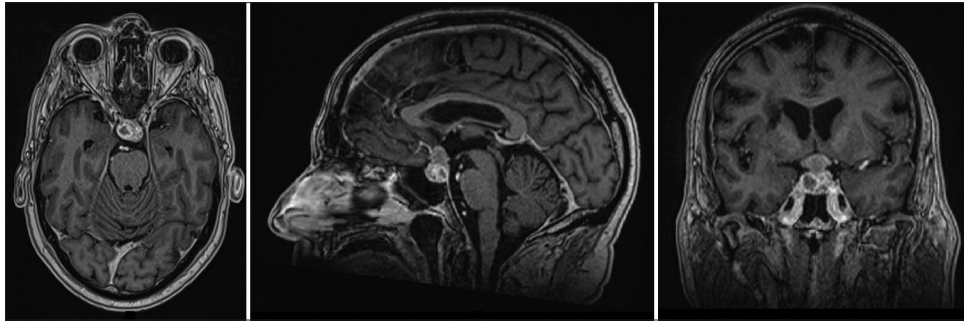


Figure 1: Postcontrast magnetic resonance imaging Head (Axial, Sagittal and Coronal Views) demonstrating the heterogeneously enhancing pituitary lesion with suprasellar extension compressing the optic chiasm

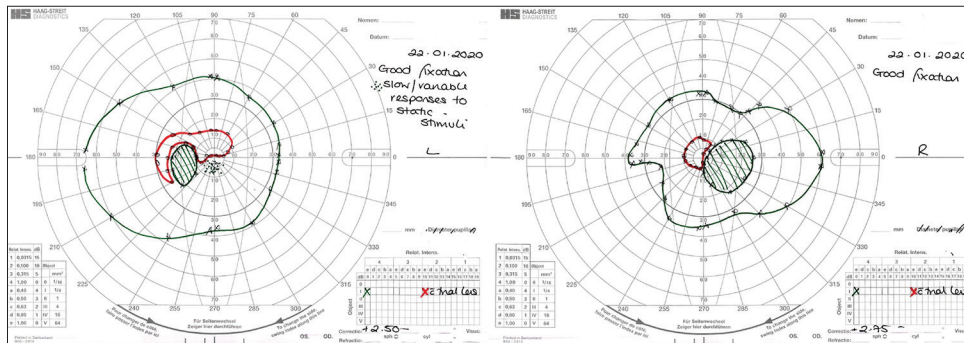


Figure 2: Preoperative Goldmann Visual Field Testing showing constricted visual fields, with a right temporal defect and left inferior arcuate defect

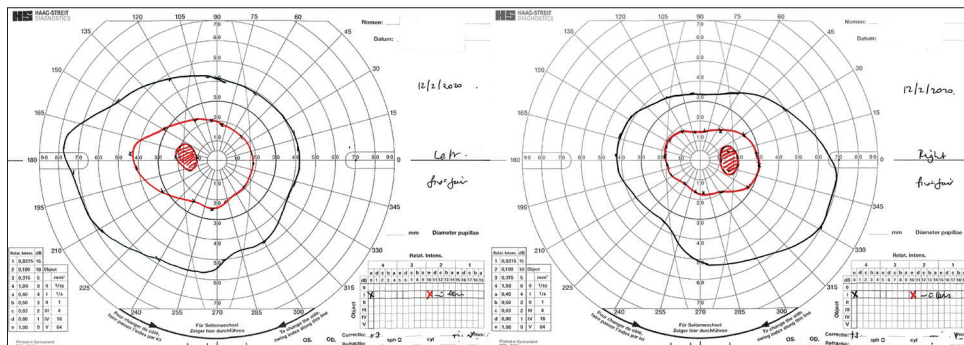


Figure 3: Postoperative Goldmann Visual Field Testing showing full visual fields

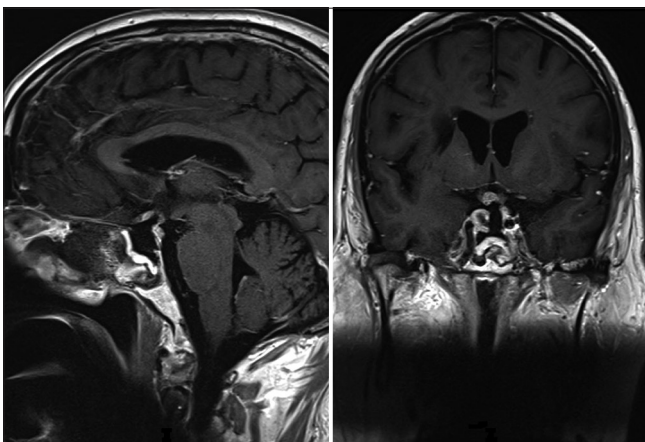


Figure 4: Postoperative magnetic resonance imaging: Significant debulking and well-decompressed optic apparatus. The small non-compressive residual tumor was addressed with adjuvant fractionated radiotherapy

adenocarcinoma and the patient received adjuvant radiotherapy to the pituitary fossa, 30 Gy in 10 fractions that was completed 6 weeks after the operation.

Four weeks after completing radiotherapy, the patient developed dry cough and breathlessness. He was admitted to his local hospital and diagnosed with COVID-19. His recovery from the pituitary metastasis was satisfactory, but regrettably, he passed away in hospital from pneumonia, 9 weeks after he had completed the radiotherapy.

### Discussion

Colorectal cancer is the third most common cancer in the world and accounts for 10% of all cancer-related mortality.<sup>[4]</sup> The most frequent metastatic sites are the liver and lungs. Metastatic disease is treated with combination

chemotherapy that can be supplemented with monoclonal antibodies and fusion proteins to improve efficacy.<sup>[4]</sup> Our patient received standard oncological treatment for the primary cancer and systematic metastasis.

Intracranial metastasis from colorectal cancer is rare, primarily involving the brain and the incidence is estimated between 1% and 3%<sup>[5]</sup> with only five previous surgically documented cases of pituitary metastasis published in the past two decades [Table 1]<sup>[6-10]</sup> In a cohort of 18 patients with pituitary metastases from our hospital that predated this case, there was no patient with colon as the primary site.<sup>[2]</sup> The previously reported cases enforce the relationship between disseminated colon cancer and pituitary metastasis, as they all had secondary deposits in either liver and/or lung, similar to our case. All five cases presented with visual symptoms. One patient presented with DI due to the involvement of the posterior pituitary gland. According to these case reports, colonic adenocarcinoma metastasis to the pituitary gland is associated with poor prognosis as the mean survival was 9.5 months (range 8 days to 15.5 months).<sup>[6-10]</sup>

The majority of metastatic pituitary tumors are asymptomatic.<sup>[11]</sup> The route by which metastatic disease reaches the pituitary is related to the arterial blood supply and as it is far richer in the posterior pituitary than the anterior pituitary, two-thirds of all metastases are found in that area, explaining the high prevalence of DI according to some reports.<sup>[11,12]</sup> In our series of 18 patients, 17% of patients had preoperative DI.<sup>[2]</sup> The parasellar extension of the mass is associated with cavernous sinus invasion and external ophthalmoplegia, whereas suprasellar extension causes visual field defects, typically bilateral hemianopia through compression of the optic chiasm.<sup>[13]</sup> Further progression results in more severe optic neuropathy with reduced visual acuity.<sup>[14]</sup>

The most common pituitary tumors are adenomas with a prevalence of 16.7% as suggested in a meta-analysis of autopsy and imaging studies.<sup>[15]</sup> Given the high prevalence of pituitary adenomas in the general population and the rarity of pituitary metastasis in colon cancer, it is

reasonable to assume that on the balance of probabilities, a pituitary mass in a patient with colon cancer is more likely to represent an adenoma. The MRI characteristics of metastasis are not specific, but heterogeneous enhancement is not common in adenomas and an expanded pituitary fossa probably represents a slow-growing lesion.<sup>[14]</sup> However, the presence of DI and rapid visual deterioration are red flags that should raise the index of suspicion in the setting of a known malignancy.<sup>[3]</sup> Therefore, we recommend a multidisciplinary approach in those patients and probably a short interval scan in equivocal cases and those that do not require surgery, to monitor for growth, as metastases are expected to grow faster compared to adenomas.<sup>[16]</sup>

The aim of treatment is the preservation and/or improvement of the visual function by decompressing the visual pathways. In our opinion, urgent surgery through an endoscopic transsphenoidal approach is preferable to radiotherapy in patients with significant or progressive loss of visual function, due to the delayed treatment effect of the latter. Fractionated radiotherapy is the mode of choice when there is the close proximity of the disease to optic apparatus, as in our case. Stereotactic radiosurgery can also be used safely and effectively in selected pituitary metastases.<sup>[17]</sup>

The 5-year survival for patients with metastatic colon cancer is currently 10%.<sup>[18]</sup> However, significant research into new immunotherapies has paved the way for the systematic management of metastatic colon cancer.<sup>[19]</sup> The aim of the treatment of pituitary metastasis is to relieve the visual symptoms and improve the quality of life and similar to patients with brain metastasis, survival mainly depends on the type and stage of primary cancer.<sup>[2]</sup> We advocate the use of endoscopic transsphenoidal surgery in selected patients as a safe and effective method of treatment in patients with colon cancer and suspected pituitary metastasis.

The adjuvant radiotherapy to the resection cavity was completed 10 days before the implementation of the national lockdown for the COVID-19 pandemic and our patient's symptoms developed 4 weeks after the last

**Table 1: Previous reported cases of Pituitary masses metastasizing from primary colon cancer<sup>[6-10]</sup>**

Author and year	Age/gender	Other metastases	Symptoms and signs	Treatment	Previous surgery	Survival after surgery
Noga et al., (2001)	60/ male	Lungs, liver	Homonymous hemianopia	Transcranial surgery	No	NA
Issa et al., (2013)	56/ female	No	Headache, left temporal hemianopia	Transnasal/transsphenoidal surgery	No	17.5 months
Ratti et al., (2013)	54/ female	Lung	Polyuria, polydipsia, diplopia, headache, vomiting	NA	No	8 days
Thewjitharoen et al., (2014)	65/ male	Lungs, liver	Left eye ptosis, vision loss	Transsphenoidal surgery	No	9 months
Skulsampaopol et al., (2017)	53/ male	Lungs	Bitemporal hemianopia	Transsphenoidal surgery	Transsphenoidal surgery (5 years)	3 months

NA – Not applicable

radiotherapy session. His treatment was not altered due to the pandemic, as the restrictions started later, but the underlying metastatic cancer and its treatments likely contributed to his demise from COVID-19.<sup>[20]</sup> A recently published study reported a significant increase in case fatality rate in cancer patients with COVID-19 infection with a mortality rate of 38% for patients with colorectal cancer.<sup>[20]</sup>

## Conclusion

Metastatic colonic adenocarcinoma to the pituitary gland is very rare and usually results in visual compromise and hypopituitarism. The index of suspicion should be high in patients with known colon cancer that present with visual and pituitary dysfunction from a pituitary mass. In patients with visual compromise, we recommend endoscopic transsphenoidal resection followed by adjuvant radiotherapy to improve vision and achieve local tumor control.

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## Conflicts of interest

There are no conflicts of interest.

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