CASE REPORT

Neurological symptoms from a brain metastasis as the first presentation of colorectal cancer

Christina Chu,¹ Shaunak Navalkissoor,² Roopinder Gillmore¹

¹Department of Oncology, Royal Free London NHS Foundation Trust, London, UK
²Department of Nuclear Medicine, Royal Free London NHS Foundation Trust, London, UK

Correspondence to
 Dr Roopinder Gillmore,
 r.gillmore@nhs.net

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SUMMARY

A 63-year-old man, a wheelchair user, from primary progressive multiple sclerosis (MS), presented with an episode of expressive dysphasia and confusion. Cerebral imaging revealed a solitary cerebral mass that was radiologically felt to be a primary brain tumour, but a brain biopsy demonstrated an adenocarcinoma in keeping with brain metastasis. Further immunohistochemistry suggested a probable colorectal primary. Subsequent staging confirmed a primary cancer within the caecum/terminal ileum, with extensive bilobar unresectable liver metastases. Unfortunately, as a consequence of the heavy tumour burden and rapid disease progression, the patient deteriorated rapidly and, due to his poor performance status, palliative chemotherapy was not deemed suitable. He was offered palliative whole brain radiotherapy to help control his symptoms, but he declined. He subsequently died at home a few weeks later, as per his wishes.

BACKGROUND

This case is unusual in that a symptomatic brain metastasis was the presenting feature of an undiagnosed colorectal malignancy.¹ Not only is the incidence of brain metastasis relatively uncommon in bowel cancer but, furthermore, it is incredibly rare at presentation. This case highlights the importance of ensuring that all patients presenting with brain metastasis are appropriately investigated and staged to ensure that appropriate treatment decisions are made. The management of patients with brain metastasis will vary greatly depending on the tumour type, the patient's performance status, the volume of brain metastasis, and the extent of extra-cranial disease.

CASE PRESENTATION

A 63-year-old man, a wheelchair user, with a history of primary progressive multiple sclerosis (MS), presented with a 3-week history of feeling generally unwell. He was noted, on admission, to have a raised white cell count $26.35 \times 10^9/L$, mildly raised C reactive protein at 27 mg/L, and an acute kidney injury with urea 36.3 mmol/L and creatinine 363 $\mu\text{mol/L}$. He was treated with antibiotics for a urinary tract infection and slowly began to improve; however, during admission, he developed an acute episode of expressive dysphasia and increasing drowsiness and confusion.

He was initially investigated with a CT of the head, without contrast (due to renal impairment), which demonstrated a large irregular mass within the right frontal lobe with significant surrounding

oedema causing local mass effect. Following this, MRI of the head, with contrast, confirmed a large solitary lesion within the right frontal lobe associated with surrounding oedema (figure 1). In view of these findings, the patient was transferred for a brain biopsy to obtain a definitive tissue diagnosis.

INVESTIGATIONS

CT of the head, without contrast (due to renal impairment), demonstrated a large irregular mass within the right frontal lobe with significant surrounding oedema, causing local mass effect with effacement of the anterior horn of the right lateral ventricle.

MRI of the brain, with contrast, confirmed an irregular right frontal lobe mass with heterogeneous T2/T1 signal, with irregular peripheral enhancement and significant mass effect. No other space-occupying lesions were identified. Mention was made of a few non-specific T2-weighted fluid-attenuated inversion recovery hyperintense foci within the deep subcortical white matter of the left cerebral hemisphere—thought to reflect the history of MS.

Brain biopsy revealed necrotic tissue fragments and small fragments of metastatic adenocarcinoma. Immunohistochemistry staining further revealed positive expression of MNF116, CK20 and CDX2, suggestive of a colorectal primary site.

Figure 1 Head MRI with contrast. T2-weighted images following gadolinium contrast, demonstrating an irregular right frontal lobe mass with irregular peripheral thick enhancement. There is significant mass effect with associated effacement of the cortical sulci and minimal midline shift to the left.

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DIFFERENTIAL DIAGNOSIS

The initial CT of the head without contrast reported a solitary brain lesion for which the differential was either infection or neoplasm.

Subsequent MRI of the head confirmed a solitary brain lesion, which was felt most likely to represent a primary brain tumour in particular a high-grade glioblastoma multiforme, although the possibility of a solitary brain metastasis was also mentioned.

In the context of metastatic disease, primary sites with the highest incidence of brain metastasis are lung (19.9%), followed by melanoma (6.9%), renal (6.5%) and breast (5.1%).²

OUTCOME AND FOLLOW-UP

Following biopsy of the brain lesion, the patient was discharged home on a weaning dose of steroids. His biopsy was reported as an adenocarcinoma, suggesting this was a site of metastatic disease rather than a primary brain tumour. His case was therefore referred to the cancer of unknown primary multidisciplinary team for further investigation and assessment.

Unfortunately, following discharge, the patient's neurology worsened and he was subsequently readmitted with increasing weakness of his left arm, poor coordination and a marked deterioration in his energy levels. At this stage, a repeat MRI of the brain demonstrated an increase in size of the right temporal/frontal mass, and two new enhancing lesions within the left temporal lobe and left cerebellar hemisphere. Furthermore, a nuclear medicine positron emission tomography (PET) scan, carried out to assess the bulk of extra-cranial disease, demonstrated findings consistent with a primary malignancy in the caecum or terminal ileum with bilobar unresectable liver metastases (figure 2).

In terms of treatment options, long discussions were held between the oncology and palliative care teams, and the patient and his family. Chemotherapy was considered to be high risk due to the patient's poor performance status, recurrent urinary tract infections and sacral sores. There was no further role for neurosurgery and, therefore, the possibility of whole brain palliative radiotherapy was discussed with the patient. After consideration, he opted not to proceed with radiotherapy. He was subsequently discharged home, according to his wishes, where he died a few weeks later.

DISCUSSION

We have identified three case studies where patients have presented with symptoms of brain metastases from a previously undiagnosed colorectal cancer.^{3–5} These cases highlight the

varied approaches in treating such patients according to the individual's performance status as well as the volume of brain and extra-cranial disease.

In the first case, a 55-year-old man presented with altered behaviour. A CT scan demonstrated a large left cerebellar lesion, which was completely excised. The histology was reported as a mucin-secreting adenocarcinoma and colonoscopy confirmed a primary bowel cancer. No extra-cranial metastases were found and thus, in view of the limited tumour burden and the patient's good performance status, the patient proceeded to a right hemicolectomy followed by adjuvant chemotherapy and cranial irradiation.³

In the second case, a 55-year-old woman presented with sudden onset bilateral blindness. A CT of the brain demonstrated a large left parietal lesion and biopsy of the brain lesion confirmed metastatic adenocarcinoma. A CT scan of the abdomen and pelvis confirmed irregular thickening of the rectum with perirectal infiltration and no metastases in liver and lung. For acute symptom control, the patient was treated initially with steroids, mannitol and palliative cranial radiotherapy. Once her condition stabilised, biopsy of the rectal mass was performed to confirm the site of the primary tumour. She was subsequently treated with palliative chemotherapy, which she tolerated, with an improvement in her vision. No long-term survival data were presented in that case.⁴

In the third case, a craniotomy was performed to investigate a right frontal mass presenting as left-sided hemiparesis. Pathology was in keeping with a colorectal metastasis and colonoscopy confirmed a tumour within the ascending colon. CT imaging revealed no extra-cranial masses and so the patient proceeded to a left hemicolectomy. Unfortunately, prior to the initiation of adjuvant whole brain radiotherapy (WBRT), widespread disease was evident with involvement of cervical lymph nodes and skin, as well as relapse of further brain metastasis. Despite further brain resection, WBRT and radiotherapy to the skin lesion, the patient died within 7 months of presentation.⁵

In the case reports described, all patients presented with isolated neurological symptoms in the absence of any associated symptoms such as change in bowel habit or rectal bleeding to suggest a primary bowel cancer. These cases highlight the potential complexity of investigating and managing patients with metastatic brain disease, and the varied treatment possibilities. Generally speaking, patients with good performance status, 1–3 brain metastases and stable or low-volume extra-cranial disease, may be candidates for aggressive local treatment with either neurosurgery or stereotactic radiosurgery for the brain metastasis. On the contrary, patients with a poor performance status,

Figure 2 (A) F-18 fluorodeoxyglucose positron emission tomography (FDG-PET) Maximum Intensity Projection demonstrating intense hypermetabolism in both lobes of the liver and in the right iliac fossa. Fused F-18 FDG-PET/CT images demonstrating intense hypermetabolism within a mass in the caecum/ileocaecal junction (B) and within bilobar liver metastases (C–E).

and extensive, rapidly progressive brain and extra-cranial metastases, would not be appropriate candidates for an aggressive neurosurgical approach and may well benefit from best supportive care alone.⁶

Learning points

- ▶ Central nervous system tumours are 10 times more likely to be from a metastatic origin—commonly lung, melanoma, renal and breast—however, they could potentially have originated in other sites.
- ▶ New neurological symptoms and signs should be investigated promptly with CT scan and/or MRI.
- ▶ Full staging on confirmation of metastatic brain disease is required.
- ▶ Treatment options will depend on several factors, including the performance status of the patient, the volume of brain disease, the burden of extra-cranial disease as well as the primary tumour diagnosis.

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REFERENCES

- 1 Barnholtz-Sloan JS, Sloan AE, Davis FG, *et al*. Incidence proportions of brain metastases in patients diagnosed (1973 to 2001) in the metropolitan detroit cancer surveillance system. *J Clin Oncol* 2004;22:2865–72.
- 2 Schouten LJ, Rutten J, Huvneers HAM, *et al*. Incidence of brain metastases in a cohort of patients with carcinoma of the breast, colon, kidney, and lung, and melanoma. *Cancer* 2002;94:2698–705.
- 3 Garg PK, Bohidar NP, Sharma MP, *et al*. Isolated cerebellar metastasis from carcinoma of the colon. *Postgrad Med J* 1999;75:119–21.
- 4 Singh T, Sajeevan KV, Jain A, *et al*. Blindness as an initial presentation of rectal cancer with brain metastases. *Saudi J Gastroenterol* 2009;15:63–4.
- 5 Goto A, Ishimine Y, Hirata T, *et al*. [Colorectal carcinoma with hemiparesis due to isolated brain metastases as an initial symptom—a case report]. *Gan To Kagaku Ryoho* 2014;41:1245–9.
- 6 Soffietti R, Cornu P, Delattre JY, *et al*. Brain metastases. In: Gilhus NE, Barnes MP, Brainin M, eds. *European handbook of neurological management*. 2nd edn. Oxford: Wiley-Blackwell, 2011:437–45.

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