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Case Report Open Access

Adenocarcinoma of Rectum with Brain Metastasis

Anita Sultan, Hawa Edriss* and Nattamol Hosiriluck

Texas Tech University Health Sciences Center, Lubbock, Texas, USA

***Corresponding author:** Hawa Edriss, Texas Tech University, Lubbock, Texas, USA, Tel: 806743-3150; E-mail: Hawa.edriss@ttuhsc.edu

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Abstract

Brain metastases are very uncommon in colorectal carcinoma. Only 2-3% of patients at time of diagnosis will have CNS involvement, and only 10% will develop brain lesions during the course of the disease. Patients with rectal carcinoma have brain involvement slightly more frequently than patients with colonic carcinoma; these metastasis are usually found concurrently with lung and/or liver metastasis. Factors associated with longer survival include age less than 65, a single CNS lesion, and the absence of bone metastasis or systemic disease. Our case demonstrates CNS involvement in a patient with known stage III adenocarcinoma of the rectum who presented with syncope and was found to have a brain mass on computed tomography (CT). Surgical management offers prolonged survival in brain metastasis of colorectal cancer. But tumor recurrence following surgery has been as high as 46%. Whole-brain radiotherapy (WBRT) improves outcome and remains the standard therapy. However, delivering this treatment over two weeks period can delay other therapy and is associated with acute and long-term toxicities. Stereotactic radiosurgery is associated with tumor control rates of 73-94% and less morbidity than WBRT. Brachytherapy, intraoperative application of (125I), has high response and control rates, a shorter treatment courses, and minimal toxicity.

Keywords: Adenocarcinoma; Rectum; Brain metastasis; Treatment modalities

Case Summary

A 61-year-old man with a past history of stage III rectal cancer status post neoadjuvant chemoradiation completed two month prior to presentation came to the Emergency Department after two episodes of syncope, each lasting a few seconds. He was diagnosed with adenocarcinoma of the rectum in November 2014. He underwent radiation therapy for the rectal mass and received chemotherapy, which was completed in January 2015. The details of chemotherapy were not available since he was initially treated in another hospital. Patient presented to our hospital with syncope in the beginning of March 2015; upon presentation he denied any lightheadedness or dizziness prior to these events. He had no loss of consciousness, weakness of his extremities, facial weakness, or slurred speech but did report visual disturbance just prior to the events. At presentation, he was afebrile with normal vital signs. His examination was significant for left lower quadrant tenderness and 3/5 strength on the left side. His labs on admission were significant for mild anemia, hypokalemia (3.3 meq/l), an elevated anion gap, and an elevated CEA (3.6 ng/ml). CT of the head revealed a 3.5 cm right temporal lobe mass with surrounding vasogenic edema and mass effect on right lateral ventricle consistent with neoplasm. Brain MRI showed 4.0×3.6 cm heterogeneous mass lesion in right temporal lobe with moderate vasogenic edema. He also had a CT of the abdomen and pelvis which showed two hypodense lesions in liver, a thickened rectosigmoid colon with local tumor extension outside the serosa into the perirectal fat, a 2.3 cm left perirectal lymph node metastasis, a 1.2 cm enlarged lymph node in the right sciatic notch, presacral edema, and retroperitoneal lymph node metastasis between the inferior vena cava and the celiac axis adjacent to right hemidiaphragm.

Based on these findings the tumor was graded as stage IV. He was started on corticosteroids for cerebral edema and levitracetam for seizure prophylaxis. The patient underwent craniotomy with right parietal mass resection; the biopsy revealed metastatic adenocarcinoma. Follow-up CT of the head and MRI showed gross total resection with decreasing vasogenic edema. Patient has been tapered off corticosteroids and is currently recovering from surgery. Outpatient radiation and chemotherapy is planned with FOLFOX (Folinic acid, Fluorouracil and Oxaliplatin) + Avastin or FOLFIRI (Folinic acid, Fluorouracil and Irinotecan) + Cituximab. He has had no follow up yet.

Discussion

Intracranial tumors in adults are usually metastatic rather than primary brain tumors. Most common tumors are from the lung, breast, and skin (melanomas) [1]. In colorectal cancer, brain metastases are rare (1-3%) and usually found after hematogenous spread to the lung and liver [2]. Lately, more aggressive strategies, including surgical resection of metastatic colorectal cancer in the lung and liver, have increased survival, which leads to a higher prevalence of brain metastasis and the emergence of other metastatic sites [3]. Patients with brain metastasis from colorectal cancer have a shorter survival than those with brain metastasis from other primary tumor sites [4]. The most common neurological symptoms are weakness or paralysis, mental status changes, and headache [5,6].

Diagnosis requires CNS imaging, biopsy, and immunohistological studies. CXCR4 expression by tumor cells is associated with increased risk of brain metastases [7]. CEA levels correlate with recurrence of colorectal cancer but have limited use in predicting brain metastasis [7]. Treatment options include surgery with or without adjuvant radiation typically in the form of WBRT. Survival with brain metastasis without treatment is about 1–2 months, and it can be improved to 3–6 months with WBRT and to 11 months with either

surgery followed by adjuvant WBRT or surgery plus adjuvant stereotactic radiosurgery [8,9].

Farnell, et al. studied 150 cases of colorectal cancer with brain involvement and reported the median overall survival with surgery, surgery plus radiation, radiation alone, and supportive care was 45, 42, 16, and 8 weeks, respectively [10]. Ko, et al. observed that patients who underwent surgery compared with other treatment interventions, such as chemotherapy, radiation, or both, had better outcomes with survival periods of 86.6 ± 17.35 vs. 2.9 ± 0.59 months (P<0.05) [5]. More recent studies have reported better outcomes with post-surgical radiotherapy with longer median survivals (7.6 vs. 4.7 months, P = 0.014) [11]. Kye, et al. conducted a study on patients with brain metastasis related to colorectal cancer and reported the median survival was significantly longer in patients who underwent surgical resection (15.2 ± 8.0 months) than in those treated by other modalities [6]. However, in patients who are not candidates for surgical intervention due to disseminated metastatic disease, radiation alone has a grim prognosis [12].

Tevlin and coworkers retrospectively reviewed prospectively gathered information on 4219 patients with colorectal cancer between 1988 and 2012. Eleven patients (0.3 %) had brain metastasis. Eight underwent surgical resection; three underwent palliative treatment. Two of the surgically treated patients received neoadjuvant chemoradiotherapy, and five patients received adjuvant therapy. The median overall survival time following diagnosis of brain metastasis was 2.5 months (range 1–9) months [13]. In 2014, another retrospective study with prospectively collected data reported results on 63 patients with brain metastasis from colorectal cancer who had neurosurgical resection followed by whole brain radiotherapy. Forty-six patients underwent curative resection, nine had stereotactic radiosurgery, 30 had whole brain radiotherapy, and 11 received steroids and palliative care. The overall median survival time from diagnosis of brain metastasis was 5.4 months. In the group of patients who underwent curative neurosurgical resection, the overall median survival time was 15.2 months. The investigators concluded that one or two brain metastatic lesions, no extracranial metastatic lesions, and neurosurgical resection were favorable prognostic factors overall and that one or two brain metastatic lesions, no extracranial metastatic lesion, and no emergence of secondary brain metastatic lesions were favorable prognostic factors in those who underwent curative neurosurgical resection. [3].

Postoperative radiation therapy (WBRT) reduces the recurrence rate to 10%–20%, but it causes impairment of neurocognitive function [14,15]. Postoperative stereotactic radiosurgery and intraoperative brachytherapy are new modalities to control the local recurrence with fewer complications. A Phase III trial from the North Central Cancer Treatment Group comparing postoperative stereotactic radiosurgery with WBRT after surgical resection for brain metastases is in progress. However, Phase I and II trials showed local control of the resection site with stereotactic radiosurgery or WBRT is similar with a range of 73% to 94% and an incidence of radiation necrosis from 0% to 10% [16,17]. The time to initiate postoperative stereotactic radiosurgery can be as long as six weeks after resection for optimal wound healing.

Brachytherapy, typically in the form of 125I, showed local control of the resection cavity in 80% and 95% of patients. Intraoperative brachytherapy is delivered at the time of resection. Unlike stereotactic radiosurgery, brachytherapy is not limited by the shape or size of the resection cavity and allows treatment delivery to irregularly shaped and large surgical cavities. Furthermore, it provides treatment delivery in one setting at the time of resection. Brachytherapy is more cost effective than WBRT and stereotactic radiosurgery [18,19].

In summary, rectal adenocarcinoma is uncommon, and surgical treatment offers better survival. Neurosurgical resection in some patients is a reasonable option, although it is not associated with long-term (5-year) survival. Stereotactic radiosurgery is associated with high tumor control rate of 73-94%, and better quality of life due to less impairment in cognitive function and less toxicity than WBRT. Brachytherapy in the form of intra-operative application of radioisotope, such as 125I and 131Cs, has high response and control rates, short treatment courses, and minimal toxicity. Studies about stereotactic radiosurgery and radioisotope brachytherapy are in progress.

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