Cerebral and Choroidal Metastases with Retinal detachement, Secondary to Rectal Cancer: A case report

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Abstract

Colorectal cancer is the most common abdominal visceral cancer diagnosed in men and in women annually and is estimated that about 106,100 new case of colon cancer and 40, 870 cases of rectal cancer would be diagnosed in 2009.

Metastasis secondary to colorectal cancer will occur in 10-20% of patients. The most common metastatic sites of colorectal cancer include, liver metastases and pulmonary metastases. Metastatic brain tumors from colorectal cancer are relatively rare between 1.03 and 1.8%.

Brain metastases in colorectal cancers are rarely encountered. Although not statistically significant, concurrent cerebral and pulmonary metastases were associated with lower rectal tumours when compared to either colonic or upper rectum. Only 4% of gastrointestinal cancers metastasize to the uvea with choroidal metastasis from colon and rectal cancer being exceedingly rare as they commonly metastasize by way of the portal route.

Treatment approaches must take into account the palliative nature of care in these patients, focusing on maintaining vision in conjunction with quality of life. The presence of these forms of metastasis, should be considered in the differential diagnoses when a patient with a history of colorectal cancer presents with neurological deficits. However, if a patient presents with a primary finding of choroidal metastasis with or without retinal detachment gastrointestinal tract malignancies, specifically colorectal cancer, should be considered as a the potential primary site of origin.

KEYWORDS: Brain, Rectal Metastases, Retinal detachement
Introduction:

Colorectal cancer is the most common abdominal visceral cancer diagnosed in men and in women annually and is the second leading cause of cancer death within the United States. The American Cancer society estimated that about 106,100 new case of colon cancer and 40, 870 cases of rectal cancer would be diagnosed in 2009. This would result in approximately 49, 920 deaths from Colorectal cancer.

Metastasis secondary to colorectal cancer will occur in 10-20% of patients even if the primary colorectal tumour undergoes curative resection, (3,13,18), Carcinoma of the colon and rectum metastasize most commonly via lymphatic pathways and portal venous vessels to the liver and less commonly through a hematogenous route. The most common metastatic sites of colorectal cancer include, liver metastases (20-30%) and pulmonary metastases (8-10%), (3, 12, 19, 33,). Metastatic brain tumors from colorectal cancer are relatively rare. Floyd et al, ascertained the incidence of brain metastases from colorectal cancer as low as 1.8 percent, occurring in 30 of 1,687 patients, while Ko et al, demonstrated an incidence 1.03 percent 37/3,773. Others authors have reported the percentage of brain metastases from colorectal cancer as high as 3.5%, however these authors did not have the population size of the Floyd and Ko studies. (14, 22, 23, 28, 31)(35).

The choroid of the eye is the thin vascular middle layer of the eye that is situated between the sclera and the retina. In humans its thickness is about 0.5 mm and the function of the choroid is to provide oxygen and nourishment to the outer layers of the retina. Metastasis to the orbit or eye, are not rare and have been well described in the literature. However, metastases to the orbit and eye arising from a gastrointestinal primary are relatively rare. Most metastases to these regions arise from the lungs, breast or skin. Fahmy et al., performed a histopathologic study on metastases to the ophthalmic region from 1969-1998 and found only one case to be metastasis from a colonic primary (36). Given that colon and rectal cancers are as prevalent lung and breast this number seems extremely low, (36, 37). We describe the only reported case of a patient with a distal rectal cancer with florid brain metastases in conjunction with intraocular metastasis to the choroid causing retinal detachment.
Case report:

43 yr old white male presented June 2006, to his primary care physician with intermittent rectal bleeding, recent weight loss of 14lbs and discomfort on defecation over a one month period. His past medical history was significant for a right knee arthroscopy and recurrent rectal bleeding in which initial evaluation was conducted in 2004. At that time a small polypoid mass was discovered at the level of the dentate line. This was not removed by the gastroenterologist due to the anatomical location, and it was recommended for the patient to follow up with a colorectal surgeon. The patient was reluctant to do so. On presentation in 2006, clinical examination identified a palpable mass in the rectum. Following this finding a colonoscopy was performed and demonstrated a 2.5 cm polypoid, non ulcerated, non obstructing mass, in the left lateral position at the level of the dentate line. This was biopsied and revealed a moderately differentiated adenocarcinoma. In conjunction with a colonoscopy the patient had an endorectal ultrasound that staged the polyp as T3N0M0. A CT scan of the abdomen and pelvis was obtained and was negative for metastatic disease, his CEA level on presentation was 1.3.

The patient presented to our unit seeking an opinion regarding sphincter preservation surgery. He was treated pre-operatively with chemoradiation, (6300 cGy, folfox). He received an additional boost to the pelvis of 800 cGy, from our normal dose of 5500 cGY because of tethering of the lesion. A folfox regimen was used after the patient consulted at multiple centers in the region.

Following completion of neoadjuvant chemoradiation, the cancer was mobile so sphincter preservation was offered. The patient underwent a laparoscopic Trans-anal, Trans-abdominal, radical proctosigmoidectomy with handsewn colo-anal anastomosis and diverting loop ileostomy in November, 2006. The operation was a R0 resection with minimal blood loss and was performed without technical difficulties. The final pathology, demonstrated a downstaged, T2N0M0 adenocarcinoma. All margins clear with a distal margin of 0.9cm. The postoperative course was significant for a prolonged ileus, in which TPN was initiated. He was discharged home tolerating a regular diet. The patient was recovering well from surgery until 4 weeks later when he presented with sudden onset of perianal and pelvic pain. A CT scan of the abdomen and pelvis was performed revealing a pelvic collection. The patient was admitted, for drainage of the pelvic collection and antibiotic therapy and this successfully resolved. A follow up CT scan from February, 2007, demonstrated significant decrease in the fluid collection but also noted a nodule in the left lower lobe of the lung. A dedicated Ct of the chest was obtained and the results were significant for nodules.
in the right upper lobe and left lower lobe. A whole body PET scan coincided with these findings and revealed uptake in the right upper lobe, left upper and lower lobe, left hilum and mediastinum. Based on these findings a bronchoscopy with biopsy and Ct guided biopsy were performed and were non diagnostic. A mediastinoscopy, was thus performed and frozen section and final pathology were consistent with metastatic adenocarcinoma of the colon and a aggressive chemotherapeutic regime of 5Fu, oxaliplatin, and leucovorin was started. After recurring perianal and pelvic pain, in November, 2007, a CT scan was obtained, to evaluate for a recurrence of the pelvic collection. The CT scan visualized a new soft tissue mass in the presacral area, which was biopsied and was positive for metastatic disease. Radiation therapy of his lung and pelvis were added to his chemotherapeutic regime. The patients’ clinical status deteriorated over the following months, and he was subsequently admitted for failure to thrive, diarrhea, dehydration and sepsis in January 2008. Blood cultures were obtained and were positive for yeast, prompting the removal of his portacatheter. As well, a peg tube was placed for hydration and nutritional purposes.

Upon admission other clinical findings included bilateral visual defects, blurry vision of the right eye and unsteady gait. An MRI of the brain, demonstrated florid brain metastasis and ophthalmologic evaluation discovered two lesions in the right eye. There was a discussion regarding a fungal versus metastatic origin of the lesions. The diagnoses of choroidal metastases was determined by further ophthalmologic testing, (Figures 1- 4). Based on the patients’ moribund presentation, treatment of the choroidal and cerebral metastasis was held and the patient was placed on hospice care.

**Figure 1 and 2**: Florid Brain Metastases
Colorectal cancer with metastasis to the brain is an uncommon event and an ominous prognostic sign. The large autopsy studies of Floyd et al, and Ko et al report an incidence of brain metastasis from colon cancer of less than 1.8% (3, 7, 23, 35). Brain metastases in colorectal cancers are rarely encountered. Despite this rare occurrence, Ko et al, also demonstrated an association between the level of the rectal cancer and predisposition for metastases to either the liver or lungs and brain. Although not statistically significant, concurrent cerebral and pulmonary metastases were associated with lower rectal tumours (8/15), when compared to either colonic or upper rectum, (>12 cm above the anal verge), (15). In theory this occurrence is more common with cancer of the lower rectum as the inferior and middle rectal veins drain systemically to the inferior vena cava and not to the portal system which drains the superior rectal vein, (15). Therefore, it is quite logical that the liver acts as a sieve for metastases from the colon and upper rectum, as do the lung and brain for the systemic venous system. In conjunction, with the small number of case reports and evidence previously discussed, Sheilds et al. demonstrated that only 4 percent of gastrointestinal cancers (18/950) metastasized to the Uvea (Iris, choroid and ciliary body). This documentation demonstrates that choroidal metastasis of gastrointestinal malignancies, (especially colon and rectal cancer) are exceedingly rare as they commonly metastasize by way of the portal route (37).

The current therapeutic approach for a patient with progressive systemic disease in conjunction with brain metastasis is an attempt to improve survival and alleviate symptoms without the compromise to quality of life. Steroids have demonstrated efficacy in relieving neurologic sequelae associated with brain
metastasis, with a median survival of 6 weeks (3). Whole brain radiation in addition to supportive care has demonstrated an improvement in median survival of up to 3 months, (9,16,). It has been demonstrated that, those patients with controlled extracranial disease, who present with one or two surgically accessible areas in the brain, may derive some benefit from surgical resection of brain metastasis. However, the 1 and 2 year survival rates are only 31% and 6.8%, (3). Therefore, based on the current survival rates for various treatment modalities for brain metastasis secondary to colorectal carcinoma, caution should be maintained when offering therapies such as these to patients, as they are generally palliative in nature.

Retinal metastasis secondary to colorectal cancer are exceedingly rare with four only cases previously reported cases. Interestingly, two of these three cases presented with ophthalmologic complaints of retinal hemorrhage and blurry vision without a previous diagnosis of colorectal cancer, (32, 33). Only Curtin et al, described metastatic disease to the retina with a history of anaplastic carcinoma of the colon, (10). Palliative modalities that have been attempted in a stable patient with isolated retinal and choroidal metastases include external beam irradiation, systemic chemotherapy, resection and enucleation (20). External beam irradiation has demonstrated efficacy in eradicating or inducing regression of retinal lesions with only mild visual improvement, (11,20, 29, 34). If an intraocular neoplasm, involves multiple anatomic locations within the eye, i.e., the choroid and not solely the retina, chemotherapy can be considered. (20). However, if the intraocular neoplasm only involves the retina, results from chemotherapy have been discouraging, (30). Resection of retinal metastases in conjunction with systemic chemotherapy has been described in a patient with melanoma and resulted in resolution of blurred vision, (5, 19). Finally, enucleation should be reserved for those patients who have failed radiation therapy and complain of intractable pain, (20). Treatment approaches must take into account the palliative nature of care in these patients, focusing on maintaining vision in conjunction with quality of life.

The presence, of these forms of metastasis, should be considered in the differential diagnoses when a patient with a history of colorectal cancer presents with neurological deficits. Conversely, if a patient presents with a primary finding of choroidal metastasis with or without retinal detachment gastrointestinal tract malignancies, specifically colorectal cancer, should be considered as a the potential primary site of origin.
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