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A Typical Metastasis of Colorectal Cancer: A Case Report and Literature Review

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Abstract:- In the world: CCR ranks 4th (breast, prostate, lung). In Europe, colorectal cancer is the second most common cancer. In Morocco, at the National Institute of Oncology in Rabat, CCR occupies 5th place (breast, cervix, lymphoma, lung), 2nd digestive after stomach. Brain metastases occur in 1 to 4% of colorectal cancer patients and its unique in 0.5% of patients. Due to its rarity, brain imaging is not recommended in the systematic monitoring of these patients. According to the literature review by Esmaeilzadeh et al, the prognosis for brain metastases from colorectal cancer is poor, with a median survival of 5.2 months. In this paper, we report the case of a 59-year-old patient who was admitted for treatment of brain metastases from colorectal cancer.

➢ ***Categories:***
Digestive Oncology, Neurosurgery, Radiotherapy, Oncology

Keywords:- *Colorectal Cancer - Brain Metastasis, Neurosurgery, Radiotherapy, Chemotherapy.*

I. INTRODUCTION

In Europe, colorectal cancer (CRC) is the second most common cancer (1). At diagnosis, 20% of people have metastases (2), mainly in the liver and also in the lungs, rarely in the brain. MCs are typically derived from bronchial carcinoma cells, breast, periodontal or melanoma cells (3). In CRC, a solitary brain stem metastasis is even more phenomenal. In fact, previous research studies have reported the occurrence of brain metastases in CRC to vary from 1% to 3% (4). Survival rates for people with lethal CRC (mCRC) have been improving progressively with advances in treatment. Typical survival for patients with mCRC is currently around 21-24 months (5). As an outcome of long-term survival with metastatic disease, the occurrence of brain metastases can be expected to improve patient survival". In the recommendations, radiological assessment of the brain to look for metastases is only recommended if there is a warning sign (38). In the literature, brain metastases secondary to colorectal cancer are rare; there are only case reports or case series (38).

II. CASE PRESENTATION

A 59-year-old woman, with a history of active smoking at 25PA not stopped, treated at the Émile Durkheim Hospital in Épinal, France, was diagnosed in April 2021 with Liberkühnian adenocarcinoma of the cecum with secondary hepatic, peritoneal and lymph node involvement, classified T4 N1 M1, MSS and mutated RAS. His baseline CEA level was 99.8 µg/dl. The initial diagnosis was an occlusive syndrome associated with a cecal tumour with invasion of liver segment V, lesion of segment IV and peritoneal carcinomatosis. The patient received chemotherapy with Folfox for a curative strategy, including 12 cycles from May to October 2021, with a partial response. In February 2022, she underwent right ileocolectomy, hepatic metastasectomy of segments IV and VI, omentectomy, bilateral adnexectomy, followed by hyperthermic intraperitoneal chemotherapy with mitomycin. In March 2022, during surveillance, progression of a right lower lobar pulmonary nodule was detected and treated by stereotactic radiotherapy at the Lorraine Cancer Institute in Nancy. The patient was well controlled until 15 November 2022, when she presented with disorientation and behavioural disturbances. CT and MRI of the brain showed a single lesion measuring 6 cm in diameter at the frontal level (Figures 1-6), with necrotic changes and perilesional oedema (Figures 1,2). No other distant lesions were found. The patient underwent a large but partial surgical excision of the brain lesion on 5 December 2022 (vascular wound of the right anterior cerebral artery). Pathological analysis revealed an adenocarcinoma compatible with a primary colorectal origin (diffuse expression of CDX2 and SATB2) (Figure 7-9). She was then treated with brain radiotherapy, which was completed in February 2023 and resulted in a marked improvement in her general condition, with no major cognitive impairment or evidence of intracranial hypertension. An abdominopelvic CT performed after completion of radiotherapy showed bilobar multifocal hepatic progression, but no pulmonary progression. In the absence of a possible surgical indication, second-line chemotherapy with FOLFIRI +/- AVASTIN was started from May to October 2023. On assessment, the ACE rate was high (3215 U/ml) and there was a 20-30% radiological liver progression. Resumption of oral chemotherapy with STIVARGA or LONSURF was considered, but given the

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lack of improvement in the patient's general condition, this option is not possible. The patient is currently on palliative care only for jaundice associated with liver progression, with no additional therapeutic resources. The lack of dilatation of the bile ducts makes any drainage impossible and exposes the patient to poor short-term risk.

3 weeks later, the clinical situation deteriorated again with very marked asthenia, without pruritus or fever, cutaneo-mucosal jaundice +++, early encephalopathy.

The last biological evaluation on 18 January 2002 confirmed the worsening of the cholestasis with a bilirubin rate that today reaches 204 mg/l of conjugated bilirubin, as well as a cytolysis more than three times normal.

We discussed at length with the patient the need to remain in hospital, given the risk of rapid clinical deterioration and the binding vital prognosis.

Despite our explanations, she did not want to follow our suggestion and wanted to go home as soon as possible.
home as soon as possible.
- She died at home.


Fig 1: Scanner with Injection

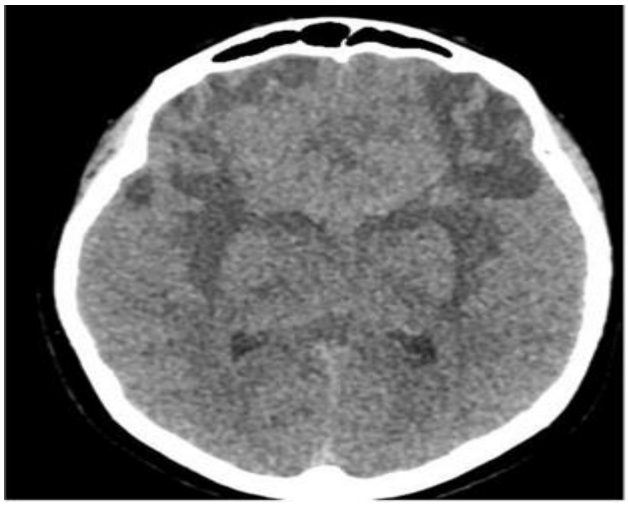
Fig 2 : Scanner without Injection

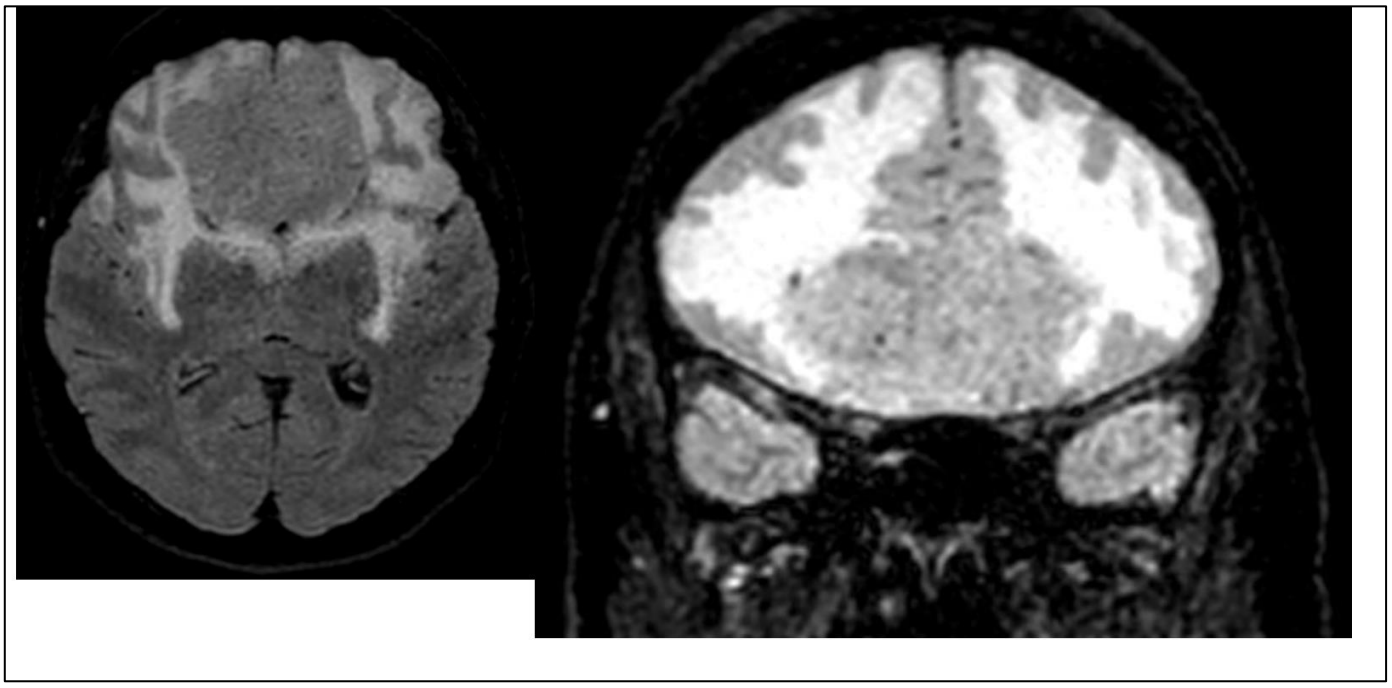
Fig 3: Scan Without Injection with Bone Reconstruction: No Lysis Bone

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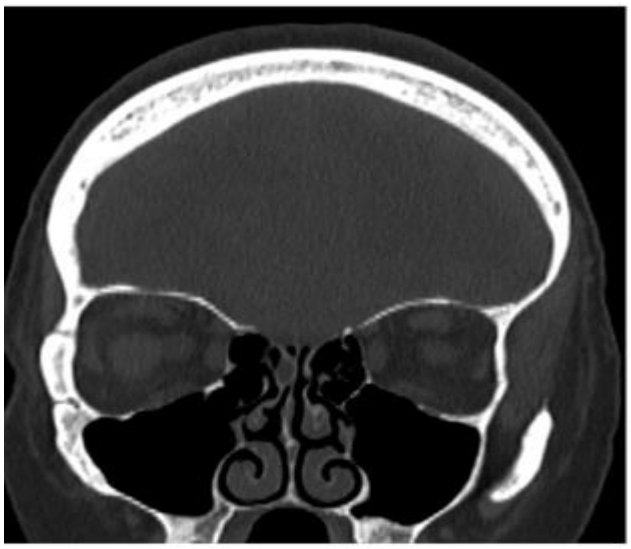

Fig 4: 3 D Flair

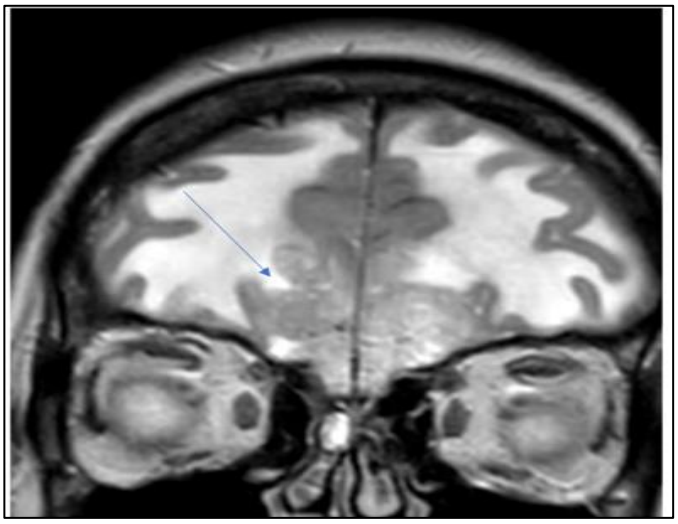

Fig 5: Invasion of Cortex

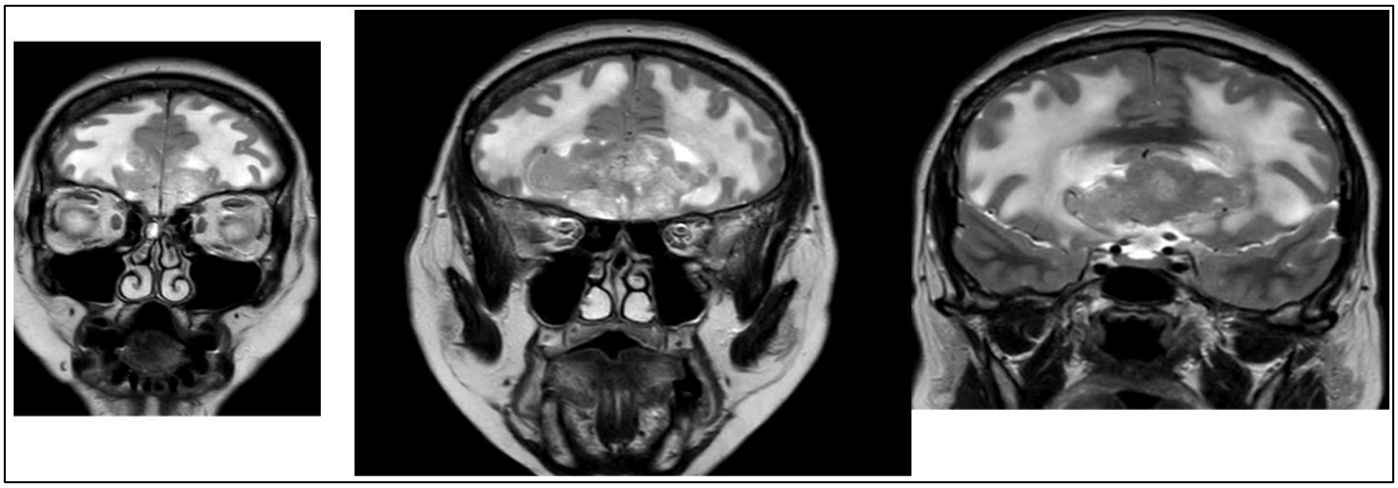

Fig 6: Extra Axial Implantation Base with Images Interposition of Perilesional Cerebrospinal Fluid. Invasion of the Fronto-Basal Cortex

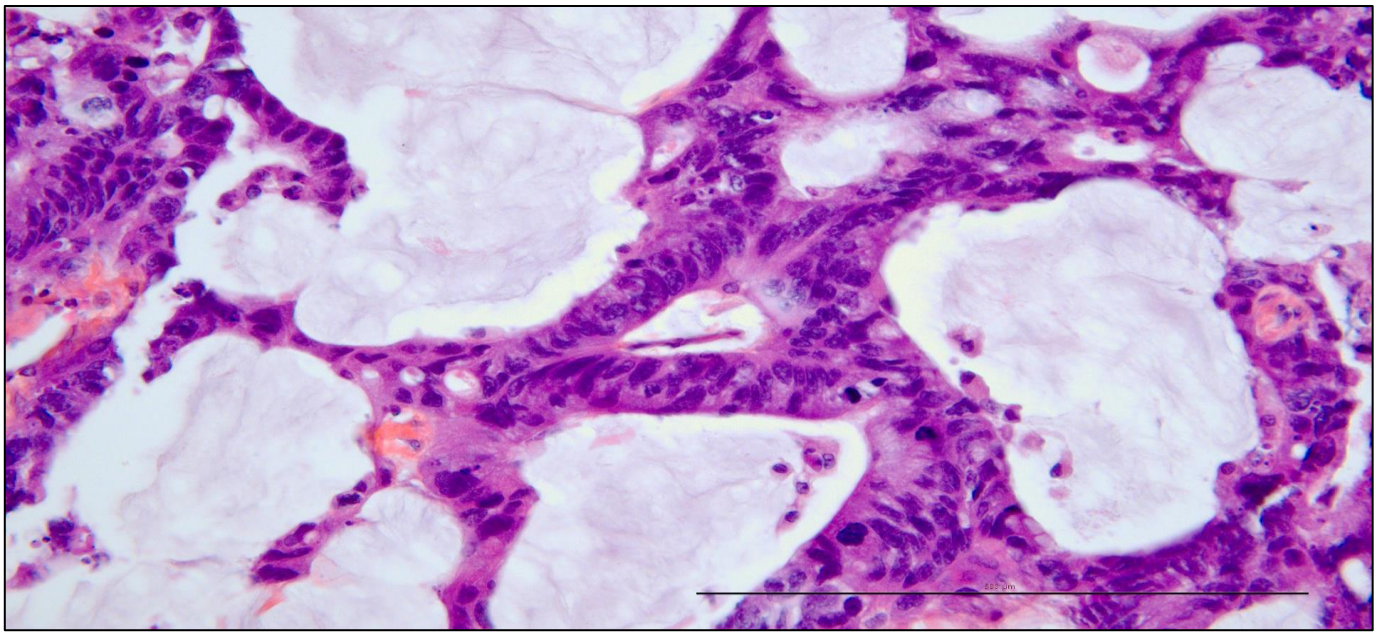

Fig 7: Adenocarcinoma, Hematoxylin Eosin and Saffron, x200

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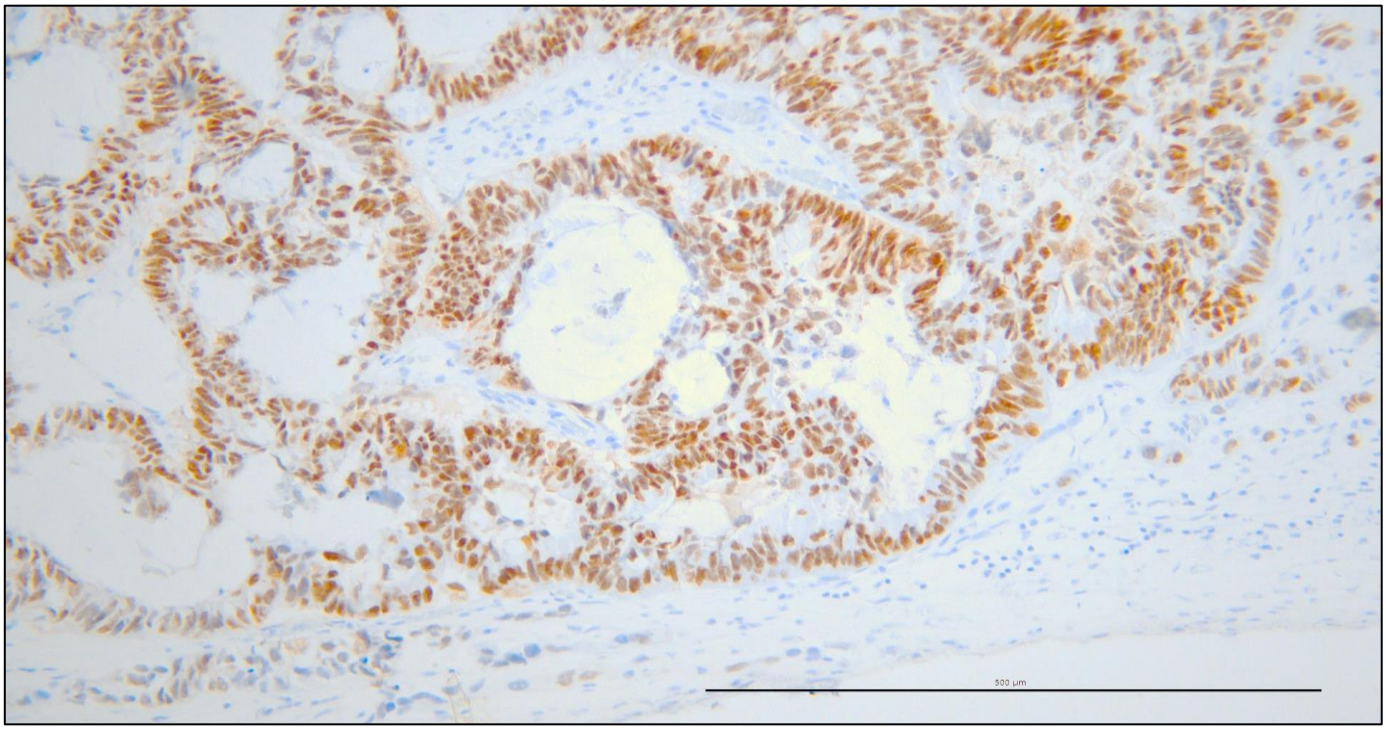

Fig 8: Positive Staining for SATB2, Immunohistochemistry, x200

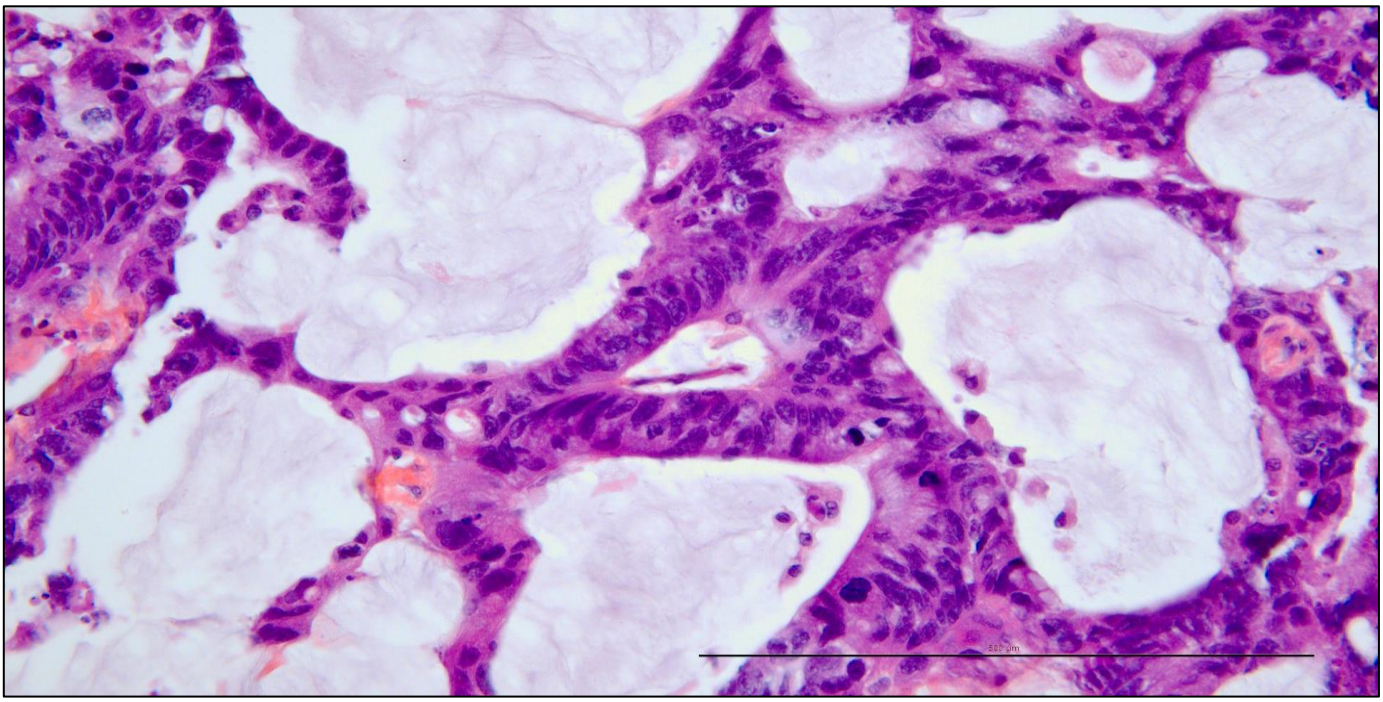

Fig 9: Adenocarcinoma, Hematoxylin Eosin and Saffron, x400

III. DISCUSSION

Brain metastases represent one of the most regular nerve problems of systemic cancer cells and are a crucial source of morbidity along with death. Mind metastases are the most common intracranial growths, surpassing key mind lumps (5). The regularity of mind metastases has actually increased with time, most likely as a result of developments in neuroimaging procedures as well as improvements in the therapy of main tumour as well as systemic illness, which have actually brought about a boost in survival.

The majority of individuals who create brain metastases have a fairly brief survival, despite the reality that preliminary therapy is generally efficient, as in our patient's case. The short survival could be the result of either a modern systemic disease (more than fifty per cent of clients) or an intractable neurological disease. Treatment of brain metastases includes corticosteroids, surgery and radiotherapy.

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Brain metastases occur in 20-40 per cent of people with cancer, are symptomatic throughout life in 60-75 per cent of people with cancer, or are discovered incidentally on CT/MRI or at death (6).

Anatomical-clinical data of brain metastases treated in Clermont-Ferrand from 2007 to 2017 (Table 1): In the series, we observe 25 Lieberkühn adenocarcinomas with molecular data. One third of these tumours are mutated for the KRAS gene, the others are called "non-mutated". No abnormality of the NRAS gene was observed. There was no significant difference in their distribution as single or multiple based on their molecular results. The majority of brain metastases of colorectal origin are single, whether mutated (70.6%) or not (62.5%).

Table 1: Comparative Overview of 10 Cases of Brain Metastasis

Case number	Reference	Year published	Age	Sex	Primary location	Time of occurrence	Metastasis location
1	Domenico, C et al (29)	2005	72	F	Colon	16	Occipital area
2	El Haddad, S et al(30)	2013	55	M	Colon	Not listed	Pineal region
3	Chu, C et al (3)	2015	63	M	Caecum	Initial Manifestation of colon cancer	Right frontal lobe
4	Gabr, J et al (31)	2016	64	M	Colon	3 weeks diagnosed with Stage IV	Left parietal+ frontal lobe
5	Esplin, B. L et al (32)	2016	55	F	Ascending	Initial Manifestation of colon cancer	Cerebellar tumor
6	MORINAGA, N et al(33)	2016	39	F	Sigmoid	18	Bilateral frontal lobes
7	SAMLALI, H et al (34)	2017	38	M	Rectosigmoid hinge	24	left spheno-temporal
8	BEGUIN, C et al (35)	2018	82	M	Colon	15	Brainstem
9	Majd, N et al (36)	2022	68	M	Colon	7	Right Parietal lobe
10	Tagayasu, Y et al (37)	2022	64	M	Lower rectum	Initial Manifestation of rectal cancer	Left frontal region

The professional discussion of brain metastases is similar to the discussion of any type of intracranial mass lesion. Headache is a presenting sign and symptom in 40% to 50% of patients with multiple metastases or with posterior fossa tumours, and may be mild. Papilledema is the cause of headache in only 15-25% of individuals. Forty per cent of people have focal neurological deficits, and seizures occur in about 15 to 20 per cent of people. Altered brain function or impaired cognition is regularly seen, especially in individuals with multiple metastases and/or increased intracranial pressure, in some cases resembling metabolic encephalopathy (39).

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Contrast-enhanced MRI is more sensitive than enhanced CT (including double-dose delayed contrast) or unenhanced MRI in detecting brain metastases, especially posterior fossa lesions or multiple punctate metastases(7, 8).Although T2-weighted images are difficult to detect vasogenic oedema as sites of increased signal intensity, not all metastatic brain has enough oedema to be detected. In fact, some studies have reported that triple gadolinium doses are significantly better than single doses(9,10). Metastases of 1 centimetre or more were easily seen with the reference doses and usually also produce a T2 signal abnormality; triple-dose gadolinium was slightly better at detecting 5-10 mm metastases and was three times more difficult to detect lesions smaller than 5 mm (10). MRI is particularly indicated for people with a single metastasis on CT who are candidates for stereotactic radiotherapy or surgical resection. (10).

Dexamethasone is the corticosteroid of choice, largely because of its minimal mineralocorticoid effect. Up to 75% of patients with brain metastases show marked clinical improvement within 24 to 72 hours of starting dexamethasone. (11).

Surgical treatment has a long history of use in the treatment of solitary brain metastases, but its role in improving diagnosis has remained unclear until recent years. Three randomised trials compared surgical resection followed by whole brain radiotherapy (WBRT) with WBRT alone (12-15). The American study (13) and the Dutch study (14) were conducted in patients with controlled or limited systemic disease, and both reported a significant improvement in survival in patients who received the combined treatment (median survival 9-10 months) compared with those who received WBRT alone (median survival 3-6 months).

A subject of debate, particularly since the introduction of MRI, is the benefit of adjuvant whole-brain radiotherapy (WBRT) after R0 or radiosurgical resection (15,24). Some retrospective studies (17,18) and a stage III trial in the USA (18) have indeed reported that adjuvant whole-brain radiotherapy after complete medical resection significantly reduces regional and distant CNS recurrence (18% with surgery + WBRT vs 70% with surgery alone according to the Patchell review), with no impact on overall survival. Similarly, WBRT combined with radiosurgery improves regional control and reduces the risk of new distant brain metastases (16,20-23), but many studies support the view that the combination of radiosurgery and WBRT does not improve overall survival (20,24-27), except in patients without extracranial metastases (28) and without neglecting the risk of very early side effects of WBRT (fatigue, alopecia, alteration of the eustachian tube) as well as late neurotoxicity.

RTOG and EORTC (European Organisation for Research and Treatment of Cancer) are conducting phase III trials to evaluate adjuvant WBRT after surgery or radiosurgery for brain metastases.

In the trial, we found that adjuvant WBRT reduced intracranial relapses and neurological deaths, although severe acute toxicity was slightly more common in the WBRT arm, but the long-term effects of WBRT are of greater concern, as WBRT has been shown to significantly impair learning and memory function.

As a result, it appears that WBRT can be withheld in high-risk patients with stable systemic disease and a limited number of brain metastases (one to three metastases) who are initially treated with either radiosurgery or surgery, if serial imaging is performed for follow-up. (28).

IV. CONCLUSION

Brain metastases are rare and their treatment is a real challenge. Due to their location, they can quickly become life-threatening. Dysphagia in a cancer patient cannot be ignored and must be integrated with other symptoms and signs to assess the need for brain imaging. With a precise and careful approach, neurosurgery followed by adjuvant SBRT radiotherapy can help control metastases, at least the symptoms associated with them, as demonstrated in this clinical case, aggressive multidisciplinary treatment can offer improvement in quality of life and potentially survival.

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