THE EXPERIENCE OF THE CLINICAL ONCOLOGY HOSPITAL OF SIBIU ON BRAIN METASTASES BETWEEN NOVEMBER 2009 AND DECEMBER 2011

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Abstract: *Brain metastases are the most common intracranial tumours found in adults: they occur as a result of the hematogenous dissemination, in 10-30% patients with cancer during their life and they are discovered in 25-40% cases at necropsy. Brain metastases are the most feared complication of generalized malignancy and the most intracranial tumours in adults. This paper presents the experience of the Clinical Oncology Hospital of Sibiu regarding the incidence, etiology, diagnosis methods, treatment and evolution in the patients with brain metastases between November 2009 and December 2011.*

Cuvinte cheie: *metastaze cerebrale, simptome neurologice, rezonanta magnetica nucleara*

Rezumat: *Metastazele cerebrale sunt cele mai frecvente tumori solide intracraniene identificate la adult: apar ca rezultat al diseminării hematogene, la 10 – 30% dintre pacienţii cu cancer în cursul vieţii, şi sunt descoperite în 25 – 40% din cazuri la necropsie. Metastazele cerebrale reprezintă cea mai de temut complicaţie a neoplaziilor generalizate şi cele mai frecvente tumori intracraniene. Lucrarea de faţă prezintă experienţa Clinicii de Oncologie Sibiu in perioada noiembrie 2009 – decembrie 2011 in ceea ce priveşte incidenţa, etiologia, metodele de diagnostic, tratmentul şi evoluţita pacienţilor cu metastaze cerebrale unice şi multiple.*

INTRODUCTION

Brain metastases are space replacement processes, which directly endanger the patient's life both by their histological nature and by their presence in the intracranial cavity. Brain is locked into a rigid box therefore, any increase in the intracranial volume is incompatible with life.

The brain is "a place of refuge" for cancer which in any other part of the body can be controlled by chemotherapy.

PURPOSE

The purpose of this study is to analyze the incidence, etiology, main types of cancer that cause brain metastases, the diagnostic methods, the therapeutic approach in the patients with suspected brain metastases, either as a first manifestation of cancer, or as the final stage in cancer evolution. We also analyzed the adherence to the radiant treatment, the therapeutic results in terms of improving the neurological symptoms, survival and quality of life and side effects of radiation on the nervous cells.

METHODS

We performed a prospective study on a total of 114 patients who came at the department of oncology of the Clinical County Emergency Hospital of Sibiu between the 1st of November 2009 and the 31st of December 2011, with suspected brain metastases.

Of the 114 patients studied, 19 were initially hospitalized in the Neurology Clinic, 4 patients were hospitalized in the Neurosurgery Clinic and 91 patients were sent to the radiotherapy department of the Oncology Clinic.

The diagnostic criteria that we had in view were the following:

1. General clinic investigation - performed for all patients;
2. Specialized neurological examination - performed for all patients;
3. Fundus exam;
4. CT exam – performed for all cases;
5. Nuclear magnetic resonance – only in cases selected in other medical centres.

The irradiation treatment was performed in the Department of Radiation Oncology of the Clinical County Emergency Hospital of Sibiu with a Theratron Elite 100 telecobaltotherapy device. The irradiation plan and the simulation were performed by using the MCR SIMULIX device.

Metastases were mostly multiple, so we irradiated the whole brain. The lower limit of the irradiation field was the skull and the angle of collimation was limited so as to avoid irradiation of the eyes, of the lens in particular, a critical organ.

The irradiation was performed in supine position, with two opposite and parallel fields. It was carried out at a total dose of 30Gy/10 fractions (3 Gy/fraction) on 12 days

The patients with relatively good general condition, with neurological disorders of less severity and who were able to move were irradiated in ambulatory conditions. The patients with major neurological deficits: hemiplegia, aphasia, phenomena of intracranial hypertension were hospitalized in the Oncology Department and besides the irradiation treatment, they have also benefited from depletive treatment: Manitol 20% 125 ml administrated 1 to 3 times a day depending on the neurological symptoms, Dexamethasone 80 mg 1 to 4 times daily. This treatment was administered concomitantly with irradiation and as the neurological phenomena have been improved, the drug therapy was suppressed, continuing with irradiation only.

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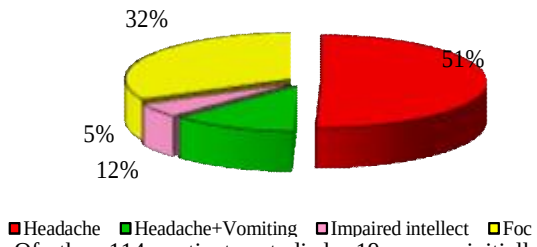
RESULTS

The distribution of the 114 cases in the studied period was the following: during the month of November – December 2009, there have been diagnosed 13 cases of brain metastases, in the year 2010, a total of 47 cases and a number of 54 cases were diagnosed in 2011.

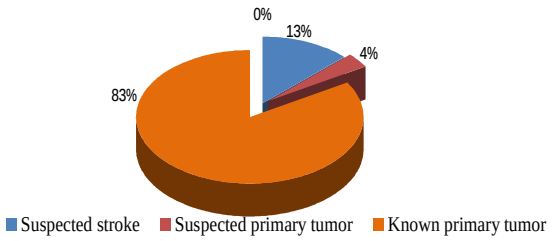
The symptoms for which the patients were hospitalized were as follows: in 51% of cases, the patients presented headaches, in 32 % of cases, focal signs, 12 % had headaches and vomiting and in 5 % of cases, impaired intellect.

Figure no. 1. Percentage distribution of symptoms upon admission



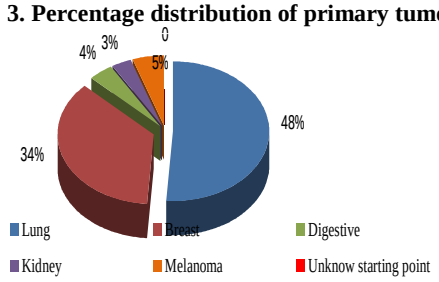
Of the 114 patients studied, 19 were initially hospitalized with suspected stroke in the Neurology Clinic, 4 patients were hospitalized in the Neurosurgery Clinic with suspected primary brain tumour and 91 patients were sent to the radiotherapy department of the Oncology Clinic with already known primary tumour suggesting the symptoms of brain metastases.

Figure no. 2. Percentage distribution of suspected diagnosis upon admission



Depending on the starting point, lung tumours were on the first place with a rate of 48% of cases, followed by metastases in breast tumours - 34% of cases, 4% digestive tract tumours, kidney tumours - 3%, melanoma - 5% and 6% of unknown starting point.

Figure no. 3. Percentage distribution of primary tumours



The incidence of brain metastases was higher in males (58% of the cases), compared to only 42% in females.

In terms of number, we noticed a predominance of multiple metastases in 92%, compared to single metastases present only in 8% of cases. Most of them were supratentorial metastases.

Treatment outcomes were as follows: in 83% of cases, the neurological symptoms have been remitted completely or partially and in 17%, the diseases have evolved. The median survival rate of the patients with brain metastases is 6 month after radiotherapy.

DISCUSSIONS

Brain metastases are the most feared complication of generalized malignancy and the most intracranial tumours in adults. Brain metastases are more frequently since the survival was prolonged in the patients with cancer. Any neurological symptoms in a patient with cancer should be considered and investigated as brain metastases.

Brain metastases are a difficult problem of diagnosis and therapeutic management for the physician and for the patient. It is an emotional and physically debilitating issue that influences in large extend the survival.

Imaging diagnosis of brain metastases is achieved by nuclear magnetic resonance, which is the currently investigation of choice. If magnetic resonance is not available (as in our case), computed tomography exam allows the diagnosis of brain metastases in most of the patients.

Note that in any clinical suspicion of brain metastases, one of these investigations should be performed as soon as possible. Any delay may lead to exceeding the useful therapeutic moment.

The therapeutic strategy depends on the number of brain metastases (single or multiple), the extracranial extension of the disease and the patient's performance status.

Surgical resection is recommended in a small number of cases, being indicated in single brain metastases located in accessible areas, in the patients with no systemic metastases and controlled primary tumour, in patients with satisfactory general condition and in those with less advanced age. Surgery must be completed by radiotherapy.

In our study, we found 4 cases that only intraoperatively and histologically have been proven to be brain metastases with lungs being the most common starting point. Surgery was carried out after imagistically supposing the presence of a primary brain tumour.

Most of the cases presented multiple metastases, poor general condition, poor prognosis and which required whole brain radiotherapy. The results are superimposable on those in the literature with a remission of the neurological symptoms in 87% of the cases and with a median survival rate of 6 months after radiotherapy. The dose of 30Gy/10 fractions, 12 days brought us therapeutic benefits, therefore we recommend it to be still used.

CONCLUSIONS

1. The incidence of brain metastases is increasing especially in lung, breast malignant tumours and melanoma.
2. Brain metastases ranks 2nd in terms of frequency within the clinical manifestations of the extranodal metastases syndrome with unspecified starting point.
3. Lung neoplasms in men and breast cancer in women were the main points of origin for brain metastases.
4. Most of the cases in our study were multiple metastases.
5. Generally, all brain metastases regardless of origin, size and number, benefit from radiant treatment.
6. Brain irradiation is well tolerated in most of the cases and it can be performed in ambulatory care setting.
7. Radiotherapy is the only active way, except for the excision surgery.
8. The median survival rate of the patients with brain metastases is 6 month after radiotherapy.

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