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Original research article

Quality of life and radiotherapy in brain metastasis patients

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ABSTRACT

Aim: The primary objective of this study was to assess whether there was an improvement in QoL for patients with brain metastases after radiotherapy treatments.

Background: Assessment of quality of life (QoL) in brain metastasis patients has become increasingly recognized as an important outcome.

Materials and methods: Patients treated for brain metastasis in our department during 2010 were included in our prospective study. QoL assessments were conducted at baseline, 1 month, and 3 months after completion of whole-brain radiotherapy (WBRT). Wilcoxon test for multiple comparisons was calculated to detect significant differences in global QoL scores.

Results: Thirty-nine patients with brain metastases completed the EORTC QLQ-C30/BN-20 questionnaire independently. Median age was 59.9 years (from 37 to 81 years). Our results report differences between the baseline and 3 months in worsening of a global health status ($p = 0.034$) and cognitive function ($p = 0.004$), as well as drowsiness ($p = 0.001$), appetite loss ($p = 0.031$) and hair loss ($p = 0.005$). There is a tendency for deterioration of physical function ($p = 0.004$), communication deficit ($p = 0.012$), and weakness of legs ($p = 0.024$), between the baseline and 1 month evaluation. There was no difference in a global cognitive status between different evaluations. Median survival time was 3 months (CI 95% 1.85; 4.15).

Conclusions: Our findings indicate a small deterioration for a global QoL status, and large deterioration for cognitive function after radiation treatments, as well as worsening of brain metastasis related symptom items. Further research is necessary to refine treatment selection for patients with brain metastases, since it may at least contribute to the stabilization of their QoL status.

1. Background

Brain metastases represent one of the most common and refractory malignancies worldwide with a rising incidence in all countries.[1] Approximately 10–30% of patients with cancer develop brain metastases during the course of their illness as an indicator of disease's progression.[2,3] An increasing trend toward prolonged patient survival has been reported, especially for breast, lung, and kidney, as a result of more efficient regimens.[4] The results of recent studies show that early identification and aggressive treatment can often ameliorate symptoms and increase both the survival and the

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Table 1 – Patient characteristics at baseline (WBRT – whole brain radiotherapy; RPA – recursive partitioning analysis; GPA – graded prognostic assessment).

		Number of patients (*n*)	Percentage (%)
Median age (years)	59.9 (37–81)		
Primary tumor	Lung	14	36.0
	Breast	16	41.0
	Melanoma	2	5.1
	Colorectal cancer	2	5.1
	Others	5	12.8
RPA classification	I	15	38.5
	II	5	12.8
	III	19	48.7
GPA classification	0–1	20	51.3
	1.5–2.5	16	41.0
	3	3	7.7
	3.5–4	0	0
Karnofsky	90–100	11	28.2
performance status	89–71	9	23.1
	<70	19	48.7
Number of lesions	1	12	30.8
	2–3	11	28.2
	>3	16	41.0
Fractionation of WBRT	30 Gy/10Fr	37	94.9
	20 Gy/5Fr	2	5.1
Initial steroid dose (dexamethasone)	4 mg	21	56.8
	5–15 mg	8	21.6
	>16 mg	8	21.6
Extra-cranial	Not progressive	13	33.3
Tumor status	Progressive	26	66.6

quality of life (QoL). During the past two decades, technical advances have been made in diagnosis and treatment of brain metastases. The cornerstones of treatment are surgery, whole brain radiotherapy (WBRT), and radiosurgery (RS).[5–7] Since the majority of patients present with multiple lesions or widespread metastatic disease, WBRT is a standard treatment to provide symptomatic relief, to allow for tapering of corticosteroid's dose, and possibly improve survival. Although many trials have shown that WBRT can reduce neurological symptoms, the median survival following the diagnosis of brain metastasis is generally only 2–4 months.[8] With the evolution of treatment techniques (RS and improved surgical interventions), there is a growing interest in stratifying these patients into those that should be treated aggressively due to a potential for longer survival, and those who should be treated with simple WBRT because of their poor survival potential.[9] Radiation Therapy Oncology Group (RTOG) database of clinical trials has developed the two most rigorous prognostic indices, the recursive partitioning analysis (RPA) and the graded prognostic assessment (GPA). RPA has been the gold standard for more than a decade, whereas GPA is its recent refinement.[10–12]

It is worth noting that most patients treated for brain metastases die of extracranial disease.[13] This is an important consideration because, although most studies have used overall survival as the main endpoint, survival is probably not the best parameter to measure the efficacy of the existing therapeutic modalities.[14] In this context, the assessment of QoL and neurocognitive function in patients with brain metastases has become increasingly recognized as an important addition to traditional outcome measures, such as length of survival and time to disease progression. The use of QoL outcomes could provide prognostic information, allowing identification of patients who will benefit from a specific intervention, preventing overtreatment of patients, or facilitating decision making for poorer prognosis patients less likely to benefit from WBRT.[15,16] Therefore, it is imperative for clinicians to be familiarized with QoL tools and utilities, since palliative therapy courses should aim to improve or at least stabilize QoL.

2. Aim

Few studies have focused on QoL and cognitive assessments as primary outcome. The primary objective of this study was to assess QoL for patients with brain metastases measured 1 and 3 months after radiation therapy treatments. Secondary objectives were to evaluate disease survival and cognitive impairment after treatment.

3. Materials and methods

All patients with diagnosed brain metastases referred to receive WBRT during the year 2010 in the *Radiotherapy Department* at *Instituto Português de Oncologia de Lisboa – Francisco Gentil* were included in our prospective study. Ethics approval was obtained from the hospital research ethics board. Computerized tomography (CT) and/or magnetic resonance imaging (MRI) scanning of the brain was mandatory. Patients with language barrier or significant cognitive impairment were excluded. Suitable patients were considered for RS at an affiliated hospital. The dose of 30 Gy in ten fractions is a standard