

Quality of life with Brain Symptom and Impact Questionnaire in patients with brain metastases

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Background: To examine the baseline characteristics of patients who underwent different treatments for brain metastases.

Methods: Allocated into group A [whole brain radiation therapy (WBRT) alone], or group B [stereotactic radiosurgery (SRS) or neurosurgery with or without WBRT], brain metastases patients with assigned treatment completed the Brain Symptom and Impact Questionnaire (BASIQ). Items of BASIQ were arranged as a symptom score or function score.

Results: Lung, breast, melanoma and renal cancer were the most prevalent primary cancer site among the study population, with 91 (53%), 25 (15%), 17 (10%) and 15 (9%) patients, respectively. Baseline BASIQ results were obtained before patients were treated with WBRT, neurosurgery, or SRS. Seventy-six (44%) and 96 patients (56%) were grouped to A and B, respectively. Group A reported lower quality of life (QOL) in all function scores ($P < 0.0001$) and all symptom scores (P values from < 0.0001 to 0.005) with the exception of energy ($P = 0.1$).

Conclusions: Baseline QOL in patients assigned WBRT alone was statistically worse as compared to patients assigned SRS, neurosurgery with or without WBRT.

Keywords: Brain metastases; cancer; quality of life (QOL)

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Introduction

Patients with brain metastases have complex symptom experiences, limited life expectancy and worsening quality of life (QOL) (1-3). Twenty to forty percent of cancer patients develop brain metastases. These patients often have some level of neurocognitive dysfunction and neurologic symptoms at baseline (4,5).

Management strategies include the use of corticosteroids to reduce edema and anticonvulsants to treat seizures.

Whole brain radiation therapy (WBRT), stereotactic radiosurgery (SRS), neurosurgery, alone or in combination are used to treat metastatic disease to brain. Factors including the extent of intracranial and extracranial disease, age and functional status often influence the selection of treatment method (6-10).

WBRT may improve neurological symptoms and function (6,11). Median survival of three to six months has been suggested in the reported studies as most of these

patients treated with WBRT have poor performance, multiple brain metastases or heavy burden of progressive systemic disease (6,11-13). WBRT alone has been reported to potentially contribute to symptom stabilization but not significantly improve most QOL domains (14-17). On the other hand, patients who do not belong to the above groups may be treated with SRS, neurosurgery with or without WBRT (18-33).

The management of brain metastases continues to evolve. Due to concerns regarding neurocognitive decline with the use of WBRT, a number of approaches including the use of SRS alone for selected patients have been advocated (34). The use of neurosurgery has shown benefit in terms of survival for selected patients with resectable single brain metastasis as compared to WBRT alone (35,36). WBRT when combined with SRS or neurosurgery improves overall brain control but at the possible detriment of neurocognitive decline (37) and worse QOL (38). In all the randomized trials, patients selected for SRS or neurosurgery had good performance status and the majority had controlled extracranial disease.

QOL is commonly assessed in brain metastases patients using multidimensional constructs encompassing both psychosocial and physical factors (39). The patient-reported QOL instruments, European Organization for Research and Treatment Cancer Quality of Life Questionnaire-Brain Neoplasm (EORTC QLQ BN20) (used alongside the QLQ-C30) and the Functional Assessment of Cancer Therapy-Brain (FACT-Br) (used alongside the FACT-General), were originally validated and intended for patients with primary brain tumours rather than those with brain metastases (9,40,41). Although brain metastases patients often have similar symptoms to patients with primary brain tumours, the prognoses and treatment regimens are different depending on primary cancer site, extent and volume of brain metastases and other sites of metastases. The two validated QOL instruments are quite lengthy (50 items for both questionnaires), and can be burdensome for advanced cancer patients (41-43).

The Brain Symptom and Impact Questionnaire (BASIQ) was developed as a novel brief QOL assessment tool for brain metastases patients. This instrument consists of 18 items that measures symptom severity (items 1-10) and impact (items 11-18) on daily functional activities. The questionnaire is scored from 0-10, with higher scores denoting worse symptom severity and lower QOL (41). The tool covers 12 domains relevant to patients with brain metastases: headaches, dizziness, nausea, numbness, energy,

balance, vision, memory, cognition, physical activities and self-care. The relative brevity of this questionnaire reduces patient burden while also maintaining the breadth of coverage. Two studies have confirmed the reliability, validity and suitability of BASIQ in patients with brain metastases (41,43).

WBRT alone is usually recommended in patients with multiple brain metastases and/or poor performance status. SRS or neurosurgery is selected for patients with limited disease and better performance status. Some radiation oncologists may decide to follow with WBRT in some patients of the latter group. For those patients selected upfront for WBRT alone versus those for SRS or neurosurgery, the purpose of this study was to examine baseline QOL (as measured by BASIQ) and patient characteristics, among patients who underwent WBRT alone versus SRS or neurosurgery with or without WBRT.

Methods

Eligibility criteria and data collection

Patients referred for treatment of brain metastases to the Odette Cancer Centre at Sunnybrook Health Sciences Centre in Toronto, Ontario, Canada were approached for entry into this study. Informed consent was obtained. Baseline BASIQ results were obtained before patients were treated with WBRT, neurosurgery, or SRS. Demographic information, including age, gender, primary cancer site, years from primary cancer to brain metastases, Karnofsky Performance Status (KPS) score, and Eastern Cooperative Oncology Group Performance Status (ECOG PS) score were collected. Eligible patients were stratified based on their treatment: WBRT alone (group A) versus SRS or neurosurgery with or without WBRT (group B).

Statistical methods

Demographics were summarized in all patients and in patients from group A or B, using median and range for age, KPS, years from primary cancer to brain cancer, and proportions for categorical variables. To compare demographics between group A and group B, Wilcoxon rank-sum nonparametric test or Fisher exact test was applied for continuous or categorical variables. Descriptive analysis on 18 BASIQ items and 2 summary scores were conducted using mean, standard deviation (SD), median and ranges in total patients and in patients from group A

or B. Wilcoxon rank-sum nonparametric test was also used to compare BASIQ items and summary scores between group A and B. Two-sided P value <0.05 was considered statistically significant. All analyses were performed using Statistical Analysis Software (SAS version 9.4 for Windows).

Results

Patient demographics

A total of 172 patients were accrued, with 76 (44%) and 96 patients (56%) grouped to A and B, respectively. Detailed demographics of the collective group are listed in *Table 1*. The median age was 62 years old (range, 24–90). Ninety-eight patients (57%) were female, and seventy-three (43%) were male. The time frame between primary cancer and development of brain metastases ranged from 0 to 28 years, with the median being 1 year. The median KPS score was 80 (range, 40–100). Eighty-four patients (55%) had KPS scores less than or equal to 80, and 68 patients (45%) had scores greater than 80. With respect to ECOG PS scores, 68 patients (45%) had a score of 0, 67 (44%) had a score of 1, 15 (10%) had a score of 2 and 2 (1%) had a score of 4. Lung, breast, melanoma and renal cancer were the most prevalent primary cancer sites among the study population, with 91 (53%), 25 (15%), 17 (10%) and 15 (9%) patients, respectively. Sixty-one patients (36%) had one brain metastasis, five had two brain metastases, thirty-eight (23%) had three brain metastases, and sixty-five (39%) had more than three brain metastases. Bone, lung, liver and lymph were among other sites of metastases observed in patients, with 32 (19%), 34 (20%), 18 (11%) and 18 (11%) patients, respectively, while 98 patients (57%) reported no other metastases (*Table 1*).

There was significant difference in age between the two groups (P=0.04); group A had a median age of 61 years old whereas group B had a median age of 66 years old. Baseline KPS scores were generally lower for group A (median =80) as opposed to group B (median =90) (P=0.02). The largest proportion of patients in group B had a KPS score of 100 (28%) compared to group A (10%) (P=0.001). Group B had significantly more ECOG PS scores of 0 and 1, with 46 patients (51%) compared to 22 patients (36%) and 41 patients (45%) in comparison to 26 patients (43%), respectively. A higher percentage of patients in group A had more than 3 brain metastases in 38 patients (50%) compared to 27 patients (29%), and a lower proportion had one brain metastasis in 23 patients (30%) compared to

Table 1 Patient demographics

Characteristics	n, %
Age (years)	
n	172
Median [range]	61.5 [24–90]
KPS	
n	152
Median [range]	80 [40–100]
KPS score	
≤80	84 (55%)
>80	68 (45%)
KPS distributions	
40	2 (1%)
50	7 (5%)
60	8 (5%)
70	26 (17%)
80	41 (27%)
90	37 (24%)
100	31 (20%)
Patients group	
A: WBRT alone	76 (44%)
B: SRS or surgery ± WBRT	96 (56%)
Years from primary cancer to brain metastases	
n	162
Median [range]	1 [0–28]
ECOG	
0	68 (45%)
1	67 (44%)
2	15 (10%)
3	2 (1%)
Gender	
Female	98 (57%)
Male	74 (43%)
Primary cancer site	
Lung	91 (53%)
Breast	25 (15%)

Table 1 (continued)

Table 1 (continued)

Characteristics	n, %
Melanoma	17 (10%)
Renal	15 (9%)
Others	24 (14%)
Dexamethasone use (n=72)	
n	72
Median [range]	8 [0.5–40]
Number of brain metastases	
1	61 (36%)
2	5 (3%)
3	38 (22%)
>3	65 (38%)
Other site of metastasis (171 available patients)	
Bone	32 (19%)
Lung	34 (20%)
Liver	18 (11%)
Lymph	18 (11%)
Others	9 (5%)
None	98 (57%)
Previous chemotherapy	
No	79 (47%)
Yes	88 (53%)
Previous hormotherapy	
No	150 (91%)
Yes	15 (9%)

KPS, Karnofsky Performance Status; WBRT, whole brain radiation therapy; SRS, stereotactic radiosurgery; ECOG, Eastern Cooperative Oncology Group.

38 patients (41%). There were more patients in group A with extra-cranial metastases when compared to group B ($P=0.0003$) (Table 2).

BASIQ items/summary scores

Baseline BASIQ scores for both groups are summarized in Table 3. Group A had significantly higher mean symptom scores pertaining to headache ($4.7>2.3$; $P=0.0001$), dizziness ($4.7>1.9$; $P<0.0001$), nausea ($4.4>1.7$; $P<0.0001$),

numbness ($4.6>2.0$; $P<0.0001$), fatigue ($6.0>4.6$; $P=0.005$), physical strength ($5.6>3.5$; $P=0.0003$), balance ($5.1>2.1$; $P<0.0001$), vision ($4.6>1.8$; $P<0.0001$), and memory ($5.5>2.7$; $P<0.0001$). Only the symptom score of energy (6.2 and 5.4 for group A and B, respectively) was not significantly higher in group A ($P=0.1$).

Group B had lower mean function scores across all eight evaluated items ($P<0.0001$): putting ideas into words ($2.1<4.7$), staying focused ($1.9<4.8$), following a story ($1.8<4.6$), reading ($1.7<4.7$), walking ($2.6<5.5$), housework ($3.0<5.6$), bathing ($1.7<4.8$) and getting dressed ($1.6<4.6$). Symptom and function summary scores also favoured group B ($P<0.0001$), with group A registering higher mean symptom (51.4 vs. 27.9) and function (38.9 vs. 15.9) scores.

Discussion

Studies (6,7,16,18,44-46) on brain metastases have evaluated overall survival, local brain tumor control, intracranial progression-free duration, neurologic function, dexamethasone dose and duration, and adverse effects between treatment options. There are also several studies (6,7,17,47,48) investigating the choice between WBRT or SRS alone, or a combination of the two treatments. All of the published randomized trials have included good prognosis patients (good performance status, controlled extracranial disease) and up to four small brain metastases for the use of radiosurgery alone, with some benefit in terms of neurocognitive sparing and QOL as compared to WBRT (37,38). Patients who are eligible for neurosurgery in the randomized trials were also those who also have good prognosis (good performance status and controlled extracranial disease) and resectable single brain metastasis. These patients who underwent neurosurgery had better survival as compared to patients who did not have neurosurgery but had WBRT alone (35,36).

Patients with multiple brain metastases and poor prognostic features (poor performance status and active extracranial disease) may be managed with palliative WBRT or comfort measures (49,50). Consistent with the inclusion of patients in the above reported trials, we also found poorer prognostic patients managed with WBRT alone and better prognostic patients managed with SRS or neurosurgery with or without WBRT. Furthermore, patients managed with WBRT alone had worse baseline QOL scores, as measured by BASIQ as compared to those managed by SRS or neurosurgery with or without WBRT.

In this study, the median KPS score was lower in group

Table 2 Comparison of demographics between the two patient groups

Characteristics	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
Age (years)			0.0362
n	96	76	
Median [range]	66 [24–90]	61 [26–89]	
KPS			0.0158
n	91	61	
Median [range]	90 [50–100]	80 [40–100]	
KPS score			0.0966
≤80	45 (49%)	39 (64%)	
>80	46 (51%)	22 (36%)	
KPS distribution			0.0012
40	0 (0%)	2 (3%)	
50	1 (1%)	6 (10%)	
60	3 (3%)	5 (8%)	
70	20 (22%)	6 (10%)	
80	21 (23%)	20 (33%)	
90	21 (23%)	16 (26%)	
100	25 (27%)	6 (10%)	
Years from primary cancer to brain metastases			0.9872
n	91	71	
Median [range]	1 [0–14]	1 [0–28]	
ECOG			0.0073
0	46 (51%)	22 (36%)	
1	41 (45%)	26 (43%)	
2	4 (4%)	11 (18%)	
3	0 (0%)	2 (3%)	
Gender			0.7559
Female	54 (56%)	45 (59%)	
Male	42 (44%)	31 (41%)	

Table 2 (continued)**Table 2** (continued)

Characteristics	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
Primary cancer site			0.3228
Lung	50 (52%)	41 (54%)	
Breast	10 (10%)	15 (20%)	
Melanoma	11 (11%)	6 (8%)	
Renal	12 (13%)	3 (4%)	
Others	13 (14%)	11 (14%)	
Dexamethasone use (n=72)			0.6232
n	37	35	
Median [range]	8 [2–40]	8 [0.5–16]	
Number of brain metastases			0.0212
1	38 (41%)	23 (30%)	
2	2 (2%)	3 (4%)	
3	26 (28%)	12 (16%)	
>3	27 (29%)	38 (50%)	
Other site of metastasis (171 available patients)			
Bone	7 (7%)	25 (33%)	<0.0001
Lung	18 (19%)	16 (21%)	0.7028
Liver	5 (5%)	13 (17%)	0.0125
Lymph	5 (5%)	13 (17%)	0.0125
Others	6 (6%)	3 (4%)	0.7328
None	67 (70%)	31 (41%)	0.0003
Previous chemotherapy			0.0053
No	53 (57%)	26 (35%)	
Yes	40 (43%)	48 (65%)	
Previous hormotherapy			0.1000
No	87 (95%)	63 (86%)	
Yes	5 (5%)	10 (14%)	

SRS, stereotactic radiosurgery; WBRT, whole brain radiation therapy; KPS, Karnofsky Performance Status; ECOG, Eastern Cooperative Oncology Group.

Table 3 BASIQ items and summary scores across both patient groups

BASIQ	Total (n=172)	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
18 items				
Headache				0.0001
N	168	93	75	
Mean	3.36	2.30	4.68	
SD	3.95	3.32	4.28	
Median	1.00	0.00	3.00	
Q1	0.00	0.00	0.00	
Q3	7.00	4.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Dizziness				<0.0001
N	171	96	75	
Mean	3.09	1.85	4.68	
SD	3.85	2.98	4.27	
Median	1.00	0.00	4.00	
Q1	0.00	0.00	0.00	
Q3	7.00	3.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Nausea				<0.0001
N	171	96	75	
Mean	2.88	1.70	4.40	
SD	3.89	3.14	4.23	
Median	0.00	0.00	3.00	
Q1	0.00	0.00	0.00	
Q3	6.00	2.50	9.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Numbness				<0.0001
N	171	96	75	
Mean	3.12	1.98	4.59	
SD	3.83	3.27	4.01	

Table 3 (continued)**Table 3** (continued)

BASIQ	Total (n=172)	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
Median	0.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	6.00	3.50	9.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Fatigue				0.0050
N	171	96	75	
Mean	5.22	4.58	6.03	
SD	3.32	3.19	3.32	
Median	5.00	5.00	5.00	
Q1	3.00	2.00	4.00	
Q3	8.00	7.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Energy				0.1171
N	171	96	75	
Mean	5.76	5.42	6.20	
SD	2.93	2.93	2.89	
Median	5.00	5.00	5.00	
Q1	4.00	3.00	4.00	
Q3	8.00	8.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Physical strength				0.0003
N	171	96	75	
Mean	4.42	3.52	5.57	
SD	3.55	3.20	3.66	
Median	5.00	3.00	5.00	
Q1	0.00	0.00	3.00	
Q3	7.00	6.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	

Table 3 (continued)

Table 3 (continued)

BASIQ	Total (n=172)	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
Balance				<0.0001
N	171	96	75	
Mean	3.41	2.08	5.11	
SD	3.91	3.21	4.08	
Median	2.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	7.00	3.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Vision				<0.0001
N	171	96	75	
Mean	3.06	1.83	4.63	
SD	3.96	3.23	4.26	
Median	0.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	7.00	3.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Memory				<0.0001
N	171	96	75	
Mean	3.91	2.68	5.48	
SD	3.92	3.44	3.95	
Median	3.00	0.00	6.00	
Q1	0.00	0.00	0.00	
Q3	8.00	5.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Putting ideas into words				<0.0001
N	171	96	75	
Mean	3.22	2.09	4.67	
SD	3.79	3.16	4.04	
Median	1.00	0.00	5.00	
Q1	0.00	0.00	0.00	

Table 3 (continued)

Table 3 (continued)

BASIQ	Total (n=172)	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
Q3	7.00	3.00	9.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Staying focused				<0.0001
N	171	96	75	
Mean	3.16	1.93	4.75	
SD	3.77	3.04	4.02	
Median	1.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	6.00	3.00	9.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Following story				<0.0001
N	168	93	75	
Mean	3.07	1.81	4.64	
SD	3.82	3.05	4.10	
Median	0.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	7.00	2.00	9.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Reading				<0.0001
N	151	83	68	
Mean	3.03	1.67	4.69	
SD	3.90	3.07	4.18	
Median	0.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	7.00	2.00	9.50	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Walking				<0.0001
N	171	96	75	
Mean	3.85	2.58	5.47	

Table 3 (continued)

Table 3 (continued)

BASIQ	Total (n=172)	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
SD	3.95	3.52	3.90	
Median	3.00	0.00	6.00	
Q1	0.00	0.00	1.00	
Q3	8.00	5.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Housework				<0.0001
N	167	92	75	
Mean	4.16	2.98	5.61	
SD	3.93	3.63	3.82	
Median	4.00	1.00	6.00	
Q1	0.00	0.00	2.00	
Q3	8.00	6.00	10.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Bathing				<0.0001
N	167	92	75	
Mean	3.10	1.67	4.84	
SD	3.98	3.19	4.17	
Median	0.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	8.00	2.00	9.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	
Get dressed				<0.0001
N	171	96	75	
Mean	2.95	1.64	4.64	
SD	3.87	3.08	4.12	
Median	0.00	0.00	5.00	
Q1	0.00	0.00	0.00	
Q3	6.00	2.00	8.00	
Min	0.00	0.00	0.00	
Max	10.00	10.00	10.00	

Table 3 (continued)

Table 3 (continued)

BASIQ	Total (n=172)	Group B: SRS or surgery ± WBRT (n=96)	Group A: WBRT alone (n=76)	P value
Summary scores				
Symptom				
N	171	96	75	<0.0001
Mean	38.2	27.9	51.4	
SD	30.78	24.02	33.49	
Median	24.0	20.0	46.0	
Q1	15.00	12.00	19.00	
Q3	62.00	32.00	82.00	
Min	4.0	7.0	4.0	
Max	100.0	100.0	100.0	
Function				
N	171	96	75	<0.0001
Mean	26.0	15.9	38.9	
SD	27.96	22.08	29.50	
Median	14.0	7.0	46.0	
Q1	1.00	0.00	10.00	
Q3	52.00	18.00	64.00	
Min	0.0	0.0	0.0	
Max	80.0	80.0	80.0	

BASIQ, Brain Symptom and Impact Questionnaire; SRS, stereotactic radiosurgery; WBRT, whole brain radiation therapy; SD, standard deviation.

A, and the distribution of ECOG scores (more patients in group B who had ECOG PS scores of 0 or 1 than group A) reaffirms that group B had better performance status than group A. Group A patients also had a higher proportion with multiple brain metastases and active uncontrolled systemic disease. Baseline BASIQ scores for patients in group A showed significantly more difficulty with vision, memory, staying focused, following a story, and putting ideas into words when compared with patients in group B ($P<0.001$). Group A also had substantially higher BASIQ scores (worse QOL) in 17 of the 18 evaluated items.

The baseline QOL results from this study may not represent the entire population of patients who undergo WBRT, SRS, neurosurgery as only English speaking

patients were enrolled and patients who declined entry into this study may have different QOL compared to patients who entered this study. Only baseline QOL as assessed by BASIQ was evaluated. We did not evaluate serial QOL outcomes after treatment. Although we reported statistically significant differences in QOL scores, we did not use methods to determine clinically meaningful differences.

In our group of brain metastases patients, those treated with WBRT alone had significantly higher baseline BASIQ scores (in 17 or 18 items), indicating worse QOL as compared to those patients treated with SRS, neurosurgery with or without WBRT. Consistent with the published randomized trials, those patients managed with SRS, neurosurgery (with or without WBRT) had generally good prognostic features including good performance status (all ECOG performance status 0–2) and less extracranial disease (70% of patients did not have extracranial disease).

Our study was limited by the fact that a significant proportion of the patients were referred from other hospitals, therefore we did not have complete data on the use of systemic therapy including chemotherapy and target therapy which also have an impact on the patient reported QOL.

This new BASIQ scale will be another alternative to the brain module with EORTC and FACT (51). Other scales such as Spitzer index (52), Functional living index-cancer (53) can be used in cancer patients or such MDASI (54) for the evaluation of neurological symptoms. For patients with advanced disease and in the late stages of the disease, the QLQ C15Pal scale (42) can be used and consists in a limited number of items. The BASIQ was developed from patients with brain metastases and can be used in conjunction.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: This study was approved by the Sunnybrook Research Ethics Board (REB), and has REB number of: 073-2013.

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