




Health-related quality of life trajectory of treatment-naïve patients with Merkel cell carcinoma receiving avelumab

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Aim: To evaluate changes in health-related quality of life (HRQoL) in a Phase II trial (NCT02155647) of treatment-naïve patients with metastatic Merkel cell carcinoma treated with avelumab (15-month follow-up). **Materials & methods:** Mixed-effect Models for Repeated Measures were applied to HRQoL data (FACT-M; EQ-5D-5L) to assess changes over time. Clinically derived progression-free survival was compared with HRQoL deterioration-free survival. **Results:** Overall, we saw relative stability in HRQoL among 116 included patients, with nonprogression associated with statistically and clinically meaningful better HRQoL compared with progressive disease. Deterioration-free survival rates (49–72% at 6 months, 40–58% at 12 months) were consistently higher/better compared with progression-free survival rates (41/31% at 6/12 months). **Conclusion:** These findings show unique longitudinal HRQoL data for treatment-naïve metastatic Merkel cell carcinoma patients treated with avelumab. **Clinical trial registration:** NCT02155647 (ClinicalTrials.gov).

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Background

Merkel cell carcinoma (MCC) is a rare, neuroendocrine cancer of the skin with poor prognosis [1,2], especially once the tumor has metastasized [3]. Primary treatment of MCC consists of tumor excision followed by radiation therapy. Despite local excision and radiotherapy, however, the tumor recurs in about a third of patients, with a substantial proportion of MCC patients experiencing metastatic disease [4,5].

Avelumab, a fully human monoclonal antibody of the immunoglobulin G1 isotype has been shown to improve treatment options for metastatic MCC, both in the first-line setting and in chemotherapy-refractory patients [6,7]. As an immunotherapy, avelumab is also expected to have a more favorable safety profile than cytotoxic chemotherapy regimens. Based on results from the Phase II single-arm, open-label, multicenter, international JAVELIN Merkel 200 trial (NCT02155647), avelumab became the first treatment for metastatic MCC patients to receive approval in the USA [8], the EU [9], Japan [10] and many other countries.

The JAVELIN Merkel 200 trial consists of two parts. In the first part, chemo-refractory patients were enrolled, in other words, patients had already received and failed one or more lines of chemotherapy treatment for metastatic MCC before joining the study, while treatment-naïve metastatic MCC patients were included in the second part of the trial. Results from chemo-refractory patients of the trial have already been published widely, including patient's health-related quality of life (HRQoL) data while receiving avelumab treatment [7,11–13]. In the present study, we are reporting on the treatment-naïve metastatic MCC patients of the JAVELIN Merkel 200 trial [6,14]. Specifically, we report the trajectory of self-reported HRQoL scores as well as HRQoL deterioration-free survival (QFS) based on 15-month follow-up data obtained from treatment-naïve metastatic MCC patients.

Materials & methods

Study design

As described above, the JAVELIN Merkel 200 trial consists of two parts, including chemo-refractory metastatic MCC patients in part 1 and patients who were naïve to systemic therapy in part 2. In both parts of the trial, patients received treatment with avelumab 10 mg/kg every 2 weeks. As part of the trial, patient-reported outcomes (PRO) questionnaires were completed at baseline, week 7 and every 6 weeks thereafter until disease progression and/or treatment discontinuation. This paper is the first to report HRQoL data obtained from metastatic MCC patients receiving avelumab as first-line MCC treatment. We focus on the 15-month follow-up dataset (cutoff date: 2 May 2019).

Study population

The intention-to-treat trial population consisted of $n = 116$ treatment-naïve metastatic MCC patients [6,14].

Patient-reported outcome assessments

The JAVELIN Merkel 200 trial included the melanoma-specific Functional Assessment of Cancer Therapy – Melanoma (FACT-M) [15] and the EQ-5D-5L [16] PRO instruments. PRO data were collected electronically at baseline, week 7 and then every 6 weeks while on treatment. For those patients who had stopped treatment, an end-of-treatment visit was assessed.

The FACT-M questionnaire is a self-administered, melanoma-specific HRQoL instrument. Although specific to melanoma, it was considered suitable for application in MCC, especially in light of the dearth of MCC-specific PRO instruments. The FACT-M includes 51 items grouped into six subscale and three summary scores. In addition, three MCC-specific FACT-M scores had been developed and validated previously [12,17], are also included in this study along with the established FACT-M subscale and summary scores, leading to a total of 12 FACT-M scores presented here. For the analysis of FACT-M data, a FACT-M PRO analysis set was defined.

The EQ-5D-5L is a self-administered, generic, preference-based HRQoL instrument developed by the EuroQol group [16,18]. It includes five single-item dimensions, each assessed using five levels and a vertical visual analog scale (VAS) for the patients to rate their current health state. The EQ VAS was used in this study but not the EQ-5D-5L index score, as the latter is typically used in other types of analyses such as economic modeling. EQ VAS ranges from 0 (worst imaginable health state) to 100 (best imaginable health state). For the analysis of EQ VAS data, an EQ-5D-5L PRO analysis set was defined.

Both the FACT-M and the EQ-5D-5L have been validated for use in MCC [12,17,19].

Statistical analysis

The statistical analyses of HRQoL data consisted of two parts.

First, change in patients' HRQoL over time was explored. As included MCC patients had metastatic disease, one major challenge is the occurrence of missing data due to patient dropout. As a result, Mixed-effect Models for Repeated Measures (MMRM) were used that can handle missing data without losing cases [20]. Two MMRMs were fitted to model change from baseline (CFB) across all 12 FACT-M subscale, summary and MCC-specific scores

and the EQ VAS. Both sets of MMRM included baseline value as a fixed effect covariate and a random intercept. The random intercept implies the compound symmetry structure, assuming constant intrasubject correlations. In the first set of MMRMs, we estimated the overall effect of the treatment (avelumab) on HRQoL over the course of the study, in other words, the average CFB across assessment time points. In the second set of MMRMs, we explored potential differences in HRQoL due to disease progression across all assessment time points. To assess group differences, we added ‘response status’ as a binary (‘nonprogression’ vs ‘progression’) fixed effect covariate to the model. The regression coefficient obtained from this analysis then describes the average change in HRQoL scores associated with nonprogression, in other words, a positive regression coefficient indicates that ‘nonprogression’ is associated with better/higher HRQoL compared with ‘progression’ and vice versa.

Second, we examined HRQoL QFS, defined as the time up to definitive HRQoL deterioration. Definitive deterioration is a change reaching or exceeding a predefined minimal important difference (MID) at least once during the study without further improvement thereafter reaching or exceeding the MID for HRQoL improvement from baseline. QFS is reported in two ways: median QFS (in months), in other words, the time until 50% of patients showed definitive HRQoL deterioration; QFS rates at different landmarks, in other words, the percentage of patients without definitive HRQoL deterioration at 6 and 12 months, respectively. Median QFS and QFS rates were estimated using the Kaplan–Meier method; obtained estimates were then qualitatively compared with median progression-free survival (PFS) and PFS rates, respectively, for context.

For the definition of HRQoL deterioration as applied in the statistical analyses, specific FACT-M ‘minimum’ and ‘maximum’ MID thresholds had been derived for application in MCC [12,17]. For the purpose of the present analyses, we only focus on the more conservative minimum MID. Further details on the FACT-M MID thresholds are reported elsewhere [17].

Results

Study population, sociodemographic/clinical characteristics of patients

A total of $n = 116$ treatment-naïve MCC patients participated in the JAVELIN Merkel 200 trial [6,14]. Of these, $n = 98$ patients provided valid FACT-M data at baseline, while $n = 100$ patients provided valid EQ-5D-5L data at baseline.

Table 1 shows the sociodemographic and clinical characteristics of patients who provided PRO data ($n = 100$). Over two thirds of MCC patients were male; average age was 73 years. The majority of patients were recruited in Western Europe (61.0%) and 27.0% in North America. Patients had received their MCC diagnosis of metastatic disease within about two and a half months of being included in this study. Excision of the primary MCC tumor was between 1 and 3 years earlier. Compliance rates for the FACT-M ranged from 75.6 to 87.9% between baseline and week 61, in other words, the assessment time point closest to the 15-month data cutoff date.

HRQoL over time using MMRM across all metastatic MCC patients

As shown in Table 2, the results of the MMRM analysis of mean change from baseline over time across all assessment time points suggest relative stability in HRQoL in patients still part of the study. That is, half (6/12) of the FACT-M subscale, summary and MCC-specific scores and the EQ VAS score show a p -value > 0.05 for CFB, indicating overall stability of HRQoL across scales. Of the remaining six FACT-M scores showing a p -value of $p < 0.05$, four scores suggest some deterioration. These scores were mostly related to physical and functional subscales, with two scores reaching respective MID threshold suggesting an important deterioration over time (i.e., functional well-being, Trial Outcome Index). In contrast, two FACT-M scores (emotional well-being, psychological impact) suggest a small overall improvement, with the former subscale exceeding the MID threshold suggesting an important improvement in emotional well-being over time in those patients still part of the study.

Change in HRQoL associated with ‘progression’ versus ‘nonprogression’

As shown in Figure 1, ‘nonprogression’ was associated with substantially higher/better HRQoL scores compared with ‘progression’ across all FACT-M subscale, summary and MCC-specific scores and the EQ VAS score. The only exception was the FACT-M melanoma surgery subscale, where the 95% CI for the group difference included zero (see Figure 1; the 95% CI starts slightly below the x-axis for this subscale). All remaining group differences were generally of a large magnitude, in other words, reaching respective MID threshold in all but two FACT-M subscales (i.e., melanoma surgery subscale, physical function; see Figure 1; the horizontal MID line is at or above the respective bar of the two subscales). These findings suggest that PRO data clearly differentiated between

Table 1. Sociodemographic/clinical characteristics of treatment-naïve patients of JAVELIN Merkel 200 trial, patient-reported outcomes analysis set population (n = 100).

Sociodemographic/clinical characteristics	n (%)
Sex	
– Male	69 (69.0%)
– Female	31 (31.0%)
Age (years)	
– Mean (SD)	72.83 (9.66)
– Median	74.00
– Range	45.00–93.00
Pooled geographic region	
– North America	27 (27.0%)
– Western Europe	61 (61.0%)
– Australasia	9 (9.0%)
– Asia	3 (3.0%)
ECOG PS at baseline	
– 0	64 (64.0%)
– 1	36 (36.0%)
Site of primary tumor	
– Non-skin	5 (5.0%)
– Skin	91 (91.0%)
– Missing	4 (4.0%)
Tumor size at baseline (mm)	
– n (missing)	99 (1)
– Mean (SD)	79.98 (57.49)
– Median	66.00
– Range	0.00–288.00
Time since initial diagnosis (years)	
– Mean (SD)	2.31 (0.73)
– Median	2.00
– Min–max	1.00–3.00
Time since first metastatic disease (months)	
– Mean (SD)	5.54 (7.71)
– Median	2.45
– Min–max	0.36–49.58

ECOG PS: Eastern Cooperative Oncology Group performance status; SD: Standard deviation.

‘progression’ and ‘nonprogression’, with the latter showing statistically significant and clinically meaningful better HRQoL over time compared with the former in EQ VAS and almost all FACT-M scales.

Median QFS

Figure 2 presents the time until definitive deterioration based on FACT-M and EQ VAS scores, respectively. That is, we estimated the length of time (in months) until half of the patients indicated a deterioration in their HRQoL scores.

Compared with median PFS, which was 4.1 months (95% CI: 1.4–6.1 months) for treatment-naïve MCC patients [21], median QFS was longer across all HRQoL scores, with some being substantially longer than the PFS (indicated by the generally higher QFS bars in Figure 2 compared with the PFS bar). For the FACT-M scores, the shortest median QFS was observed for physical well-being, functional well-being, the melanoma subscale and the FACT-M Trial Outcome Index, respectively, with half of the patients presenting a definitive deterioration in terms of HRQoL around 4.5–5.8 months after their first treatment dose. Censoring rates ranged from 45% (physical well-being) to up to 66% (psychological impact). Due to a large amount of censoring, median QFS could not be estimated for emotional well-being and psychological impact.

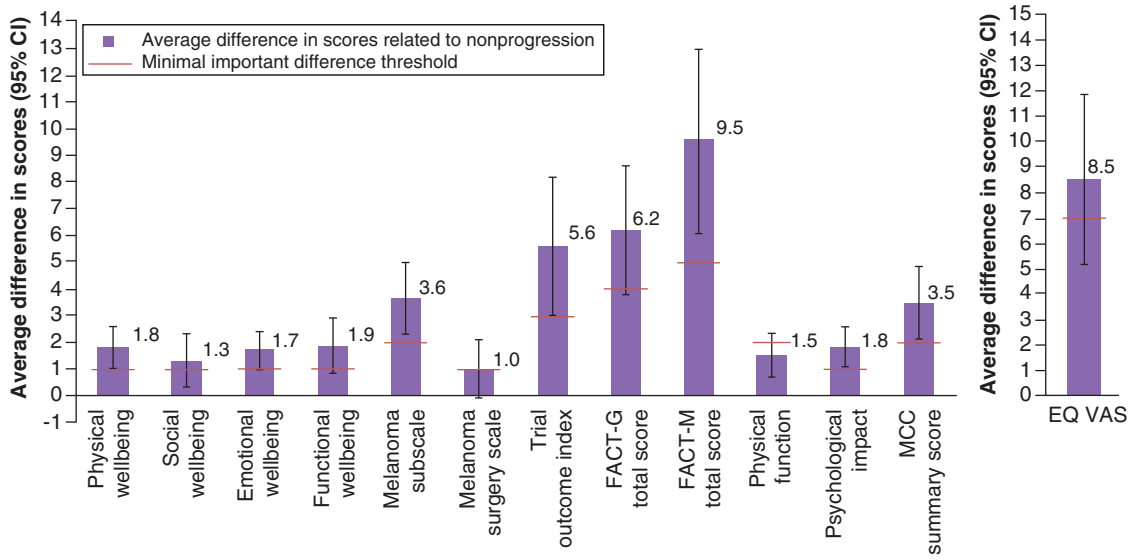


Figure 1. Average difference in scores related to nonprogression (magnitude of respective bars show by how much patients with nonprogression reported higher health-related quality of life compared with patients with progression).

FACT-M: Functional Assessment of Cancer Therapy – Melanoma; FACT-G: Functional Assessment of Cancer Therapy – General; MCC: Merkel cell carcinoma; VAS: Visual analog scale.

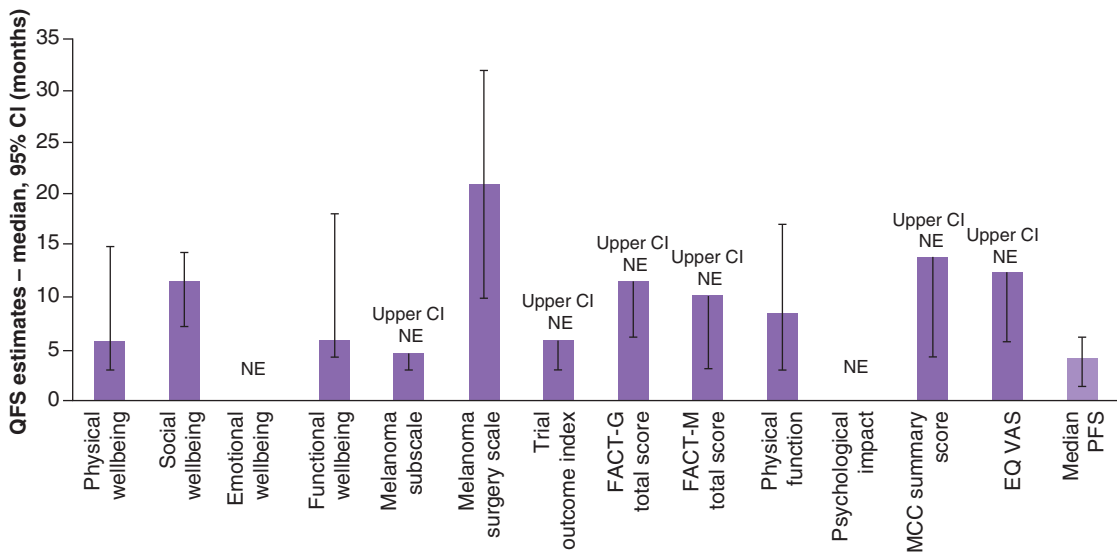


Figure 2. Health-related quality of life-based deterioration-free survival in terms of time to definitive deterioration based on Functional Assessment of Cancer Therapy – Melanoma and EQ visual analog scale versus progression-free survival (in median months).

FACT-M: Functional Assessment of Cancer Therapy – Melanoma; FACT-G: Functional Assessment of Cancer Therapy – General; MCC: Merkel cell carcinoma; NE: Not estimable; PFS: Progression-free survival; QFS: Deterioration-free survival; VAS: Visual analog scale.

Table 2. Trajectory of health-related quality of life over time (overall effect across all visits).

FACT-M subscale, summary, MCC-specific and EQ VAS	MMRM [†] with 'baseline value' as fixed-effect covariate		MID
	Average mean change (95% CI)	p-value	
FACT-M			
PWB	-0.96 (-1.72; -0.21)	0.0125 [‡]	1
SWB	0.11 (-0.47; 0.69)	0.7187	1
EWB	1.03 (0.45; 1.62)	0.0006 [‡]	1
FWB	-1.12 (-2.00; -0.25)	0.0119 [‡]	1
MS	-0.92 (-2.13; 0.30)	0.1404	2
MSS	0.50 (-0.42; 1.42)	0.2871	1
TOI	-3.14 (-5.67; -0.62)	0.0149 [‡]	3
FACT-G total score	-0.82 (-2.99; 1.34)	0.4539	4
FACT-M total score	-1.88 (-5.12; 1.35)	0.2539	5
MCC-specific scores			
PF	-1.27 (-2.08; -0.46)	0.0022 [‡]	2
PI	0.97 (0.37; 1.57)	0.0015 [‡]	1
MCC summary score	-0.34 (-1.62; 0.94)	0.6006	2
EQ-5D-5L			
EQ VAS	0.36 (-2.64; 3.36)	0.8138	7

[†]MMRMs included baseline value as a fixed-effect covariate and a random intercept to model intra-subject correlations;

[‡]p-value < 0.05.

EWB: Emotional well-being; FACT-M: Functional Assessment of Cancer Therapy – Melanoma; FACT-G: Functional Assessment of Cancer Therapy – General; FWB: Functional well-being; MCC: Merkel cell carcinoma; MID: Minimal important difference; MMRM: Mixed-effect Models for Repeated Measures; MS: Melanoma subscale; MSS: Melanoma surgery scale; PF: Physical function; PI: Psychological impact; PWB: Physical well-being; SWB: Social/family well-being; TOI: Trial outcome index; VAS: Visual analog scale.

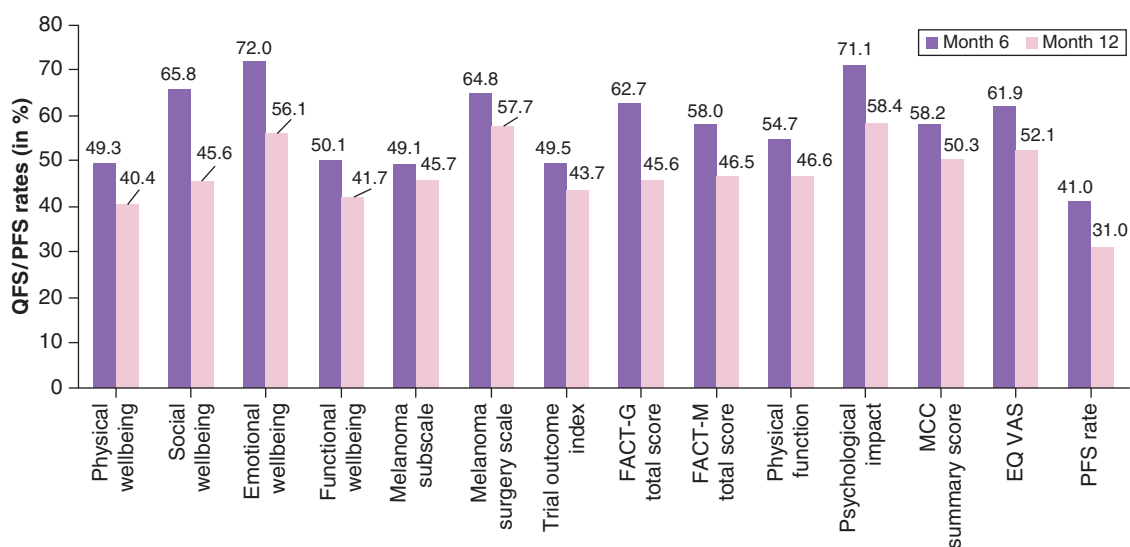


Figure 3. Health-related quality of life-based deterioration-free survival rates based on Functional Assessment of Cancer Therapy – Melanoma and EQ visual analog scale versus progression-free survival rates; 6 and 12 months. FACT-M: Functional Assessment of Cancer Therapy – Melanoma; FACT-G: Functional Assessment of Cancer Therapy – General; MCC: Merkel cell carcinoma; PFS: Progression-free survival; QFS: Deterioration-free survival; VAS: Visual analog scale.

QFS rates

QFS rates show the percentage of patients without definitive HRQoL deterioration at 6 and 12 months, respectively. As shown in Figure 3, for the FACT-M subscale, summary and MCC-specific scores, QFS rates ranged from 49% (melanoma subscale, physical well-being) to up to 72% (emotional well-being) at 6 months. At 12 months, QFS

rates ranged from 40% (physical well-being) to up to 58% (psychological impact, melanoma surgery subscale). For EQ VAS, QFS rates were 62% at 6 months and 52% at 12 months, respectively. In comparison, all QFS rates were higher than PFS rates, which were 41% and 31% at 6 and 12 months, respectively [21].

Discussion

The aim of this study was to assess HRQoL of patients who took part in the JAVELIN Merkel 200 trial, a single-arm, open-label, multicenter, international Phase II study exploring the efficacy of avelumab in treatment-naïve metastatic MCC patients. Specifically, we aimed to explore the trajectory of self-reported HRQoL scores based on MMRM analysis and exploring HRQoL QFS based on FACT-M and EQ VAS data. This study is the first to present PRO data obtained from treatment-naïve metastatic MCC patients of the JAVELIN Merkel 200 trial.

The results of the general MMRM analysis show overall stability of HRQoL among all patients, in other words, a favorable finding, as HRQoL deterioration might be expected in patients with metastatic disease. When exploring the specific FACT-M domains, there was evidence for some improvement in emotional well-being, while there was a trend toward poorer functional and physical well-being over time. When exploring progression status, clear group differences were seen, with 'nonprogression' resulting in statistically and clinically meaningful better HRQoL compared with disease progression, in other words, differences were as expected and consistent with clinical response status.

The median duration of HRQoL QFS ranged from 4.5 months to 1 year and beyond across EQ VAS and the different FACT-M scales. Of note, the QFS of the two emotional domains emotional well-being and psychological impact was not estimable, because 'definitive deterioration' had not yet occurred for at least half of the patients at the time of data cutoff, which is in line with the results of the MMRM analyses, suggesting that patients remaining in the study seemed to be emotionally stable or even to improve over time. Compared with median PFS, median QFS was consistently longer, which was also reflected in respective QFS rates at 6 and 12 months being consistently higher than respective PFS rates at these time points.

This study is the first to present PRO data based on treatment-naïve MCC patients of the JAVELIN Merkel 200 trial, while substantive quantitative and qualitative work around PRO data from chemotherapy-refractory MCC patients of the same trial has already been published extensively. Quantitative findings were largely consistent with the findings of the present study. That is, the analyses of PRO data obtained from chemo-refractory patients also showed that QFS rates were generally higher than respective PFS rates [22]. Also, the comparison of 'nonprogression' with progressive disease suggested clinically better HRQoL in nonprogressed disease in the chemo-refractory MCC cohort, like in the present study [11]. Similarly, qualitative findings based on treatment-naïve MCC patients were again largely in line with the findings from chemo-refractory MCC patients in that all patients indicated similar experiences regarding perceived benefits and clinical changes during the JAVELIN Merkel 200 trial [23,24].

This study has limitations. A major challenge is the high attrition rate with substantial patient dropout throughout the trial especially within the first 6 months of study inception. While high patient dropout can be expected in metastatic disease, diminishing sample sizes result in large 95% CIs in the QFS analyses, which are indicative of uncertainty around the estimates. A further limitation is that MMRM analyses only provide unbiased estimates if data are missing at random; however, this assumption cannot be tested empirically, so that it cannot be ruled out that the missing data pattern was nonrandom. Also, PRO data were only collected until the end of treatment, which was often triggered by disease progression with two consequences. First, an underestimation of deterioration since, for some patients, HRQoL may have deteriorated shortly after disease progression, in other words, shortly after leaving the study and second, relatively high censoring rates in the QFS analyses. Finally, we used a melanoma-specific PRO instrument in a cohort of MCC patients. MCC patients tend to be about 10 years older on average than melanoma patients, which is true for our sample with an observed mean age of 73 years. Therefore, it cannot be ruled out that especially some of the oldest participants (up to 93 years of age in our sample) found it challenging to fill out the instrument correctly. Also, some of the melanoma-specific items may not be applicable to MCC patients, as supported by our psychometric analyses where both melanoma subscales showed worse performance than the other scales [17]. However, in light of the dearth of MCC-specific PRO instruments and the exceptionally strong performance of the MCC-specific FACT-M scales physical function and psychological impact [17] gives us confidence that the use of the FACT-M in this study was appropriate and delivered high quality HRQoL data.

Conclusion

These findings show unique longitudinal HRQoL data for treatment-naïve metastatic MCC patients treated with avelumab in a relatively large sample for a rare disease. Relatively stable HRQoL scores were observed over time. When differentiating patients by progression status, ‘nonprogression’ was associated with statistically and clinically meaningful better HRQoL compared with progressive disease. Finally, time-to-event analyses suggest longer HRQoL QFS compared with PFS. In conclusion, these data provide important insight into self-reported HRQoL of treatment-naïve metastatic MCC patients over time while receiving avelumab treatment, validating previous findings of the positive impact of avelumab treatment of patients’ HRQoL among metastatic MCC.

Summary points

- This study presents unique longitudinal health-related quality of life (HRQoL) data for treatment-naïve metastatic Merkel cell carcinoma (MCC) patients treated with avelumab in a relatively large sample for a rare disease.
- Compliance rates for the HRQoL data ranged from 75.6 to 87.9% between baseline and the 15-month data cutoff date.
- In treatment-naïve metastatic MCC patients treated with avelumab, nonprogression was associated with statistically and clinically meaningful better HRQoL compared with progressive disease.
- While on avelumab treatment, patients had stable HRQoL for 6 out of the 12 Functional Assessment of Cancer Therapy – Melanoma (FACT-M)/EQ visual analog scale scores considered.
- Four FACT-M scores suggested some deterioration related to physical and functional subscales, while there was evidence for some improvements in emotional well-being and the psychological impact score.
- Median HRQoL deterioration-free survival, defined as the time until a definitive deterioration in HRQoL reaching or exceeding the minimal important difference, was longer than median progression-free survival across all FACT-M/EQ visual analog scale scores considered.
- Deterioration-free survival rates at 6 and 12 months were consistently higher than respective progression-free survival rates at these time points.
- This study in treatment-naïve metastatic MCC patients on treatment with avelumab validates previous HRQoL findings in patients with chemotherapy-refractory metastatic MCC.

Author contributions

SP D’Angelo, C Lebbé, L Mortier, AS Brohl, N Fazio, JJ Grob, S Pusceddu, GJ Hanna, JC Hassel, F Kiecker, B Ellers-Lenz, M Bajars, G Güzel and P Nghiem participated in data collection and review of the manuscript; S Nolte reviewed and edited the analysis plan and drafted the manuscript; M Bharmal participated in the study design, analysis plan, data interpretation and drafting and review of the manuscript; M Hunger reviewed and edited the analysis plan, interpreted the data and reviewed the manuscript; M Schlichting reviewed the analysis plan and the manuscript; M Henry-Szatkowski conducted the analyses, interpreted the data and reviewed the manuscript.

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Financial & competing interests disclosure

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No writing assistance was utilized in the production of this manuscript.

Ethical conduct of research

This study was performed in compliance with the ethical principles arising from the Declaration of Helsinki and all current local regulations. The study protocol was approved by Independent Ethics Committee or Institutional Review Board prior to the study launch at each site. All patients gave written informed consent.

Data sharing statement

For all new products or new indications approved in both the European Union and the USA after 1 January 2014, Merck KGaA, Darmstadt, Germany will share patient-level and study-level data after de-identification, as well as redacted study protocols and clinical study reports from clinical trials in patients. These data will be shared with qualified scientific and medical researchers, upon researcher's request, as necessary for conducting legitimate research. Such requests must be submitted in writing to the company's data sharing portal. More information can be found at <https://www.merckgroup.com/en/research/our-approach-to-research-and-development/healthcare/clinical-trials/commitment-responsible-data-sharing.html>. Where Merck KGaA has a co-research, codevelopment or comarketing/copromotion agreement or where the product has been out-licensed, it is recognized that the responsibility for disclosure may be dependent on the agreement between parties. Under these circumstances, Merck KGaA will endeavor to gain agreement to share data in response to requests.

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Article details



Title
Health-related quality of life trajectory of treatment-naïve patients with Merkel cell carcinoma receiving avelumab

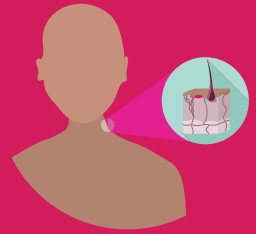


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Citation
Future Oncology (2020) doi/10.2217/fo-2020-0426

This study presents unique longitudinal HRQoL data for treatment-naïve metastatic MCC patients treated with avelumab in a relatively large sample for a rare disease



Compliance rates for the HRQoL data for those still in the study were > 75% for the entire study period

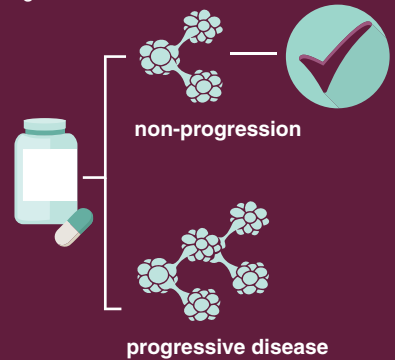
Four FACT-M scores suggested some deterioration related to physical and functional subscales



There was evidence for some improvements in emotional well-being and the psychological impact score



In treatment-naïve metastatic MCC patients treated with avelumab, non-progression was associated with statistically and clinically meaningful better HRQoL compared with progressive disease



While on avelumab treatment, patients had stable HRQoL for 6 out of the 12 FACT-M/EQ VAS scores considered

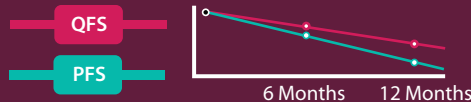


Median QFS, defined as the time until 50% of patients showed definitive deterioration in HRQoL reaching or exceeding the minimal important difference, was longer than median PFS across all FACT-M/EQ VAS scored considered



PFS

QFS



QFS rates, i.e., the % of patients without definitive HRQoL deterioration at 6 and 12 months, were consistently higher than PFS rates

The results of this study in treatment-naïve metastatic MCC patients are consistent with previous findings in patients with chemotherapy-refractory metastatic MCC

Glossary

EQ VAS: EuroQoL Visual Analogue Scale; FACT-M: Functional Assessment of Cancer Therapy – Melanoma; HRQoL: Health-related quality of life; MCC: Merkel cell carcinoma; PFS: Progression-free survival; QFS: HRQoL-deterioration-free survival