Estimating Quality-Adjusted Life Years and Life-Years Gained in Glioblastoma Patients: Analysis from the TIGER Trial

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BACKGROUND

- Glioblastoma (GBM) is the most aggressive and common primary malignant brain tumor in adults, with a median overall survival (OS) of approximately 15 months following standard treatment with surgical resection, radiotherapy, and temozolomide (TMZ) chemotherapy (Stupp et al., 2005).
- Tumor Treating Fields (TTFields), a non-invasive therapy delivering low-intensity, alternating electric fields, demonstrated significant survival benefits when combined with TMZ in newly diagnosed GBM patients (Stupp et al., 2017); real-world data are critical to evaluate its broader clinical impact.
- The TIGER study provides real-world evidence (RWE) on the effectiveness of TTFields in Germany, reflecting routine clinical practice and more diverse patient populations, and enables quantification of life-years gained (LYG) and quality-adjusted life-years (QALYs) to inform value-based healthcare decisions.

OBJECTIVE

- To quantify the quality-adjusted life years (QALYs) and life-years gained (LYG) associated with TTFields in newly diagnosed GBM using real-world data from the TIGER study and compare findings with the EF-14 trial to assess external validity and generalizability.

METHODS

- This analysis used data from the TIGER trial, a prospective, non-interventional study of 710 glioblastoma (GBM) patients across 81 centers in Germany between 2017 and 2019.
- The intention-to-treat (ITT) population was evaluated. Patients included were adults with newly diagnosed GBM who had completed standard chemoradiotherapy and initiated Tumor Treating Fields (TTFields) therapy.
- A three-state partitioned survival model was developed to estimate both life-years (LYs) and quality-adjusted life-years (QALYs) over a lifetime horizon.
- Overall survival (OS) and progression-free survival (PFS) were based on Kaplan-Meier data from the TIGER and EF-14 trials, with extrapolations applied to ensure robust long-term projections.
- Utility values were sourced from published literature, applying 0.80 for stable disease and 0.48 for progressive disease (Garside et al., 2007; NICE TA121); quality-adjusted life-years (QALYs) were calculated by multiplying health-state utilities by time spent in each state, and life-years gained (LYG) were derived as total unadjusted survival time.

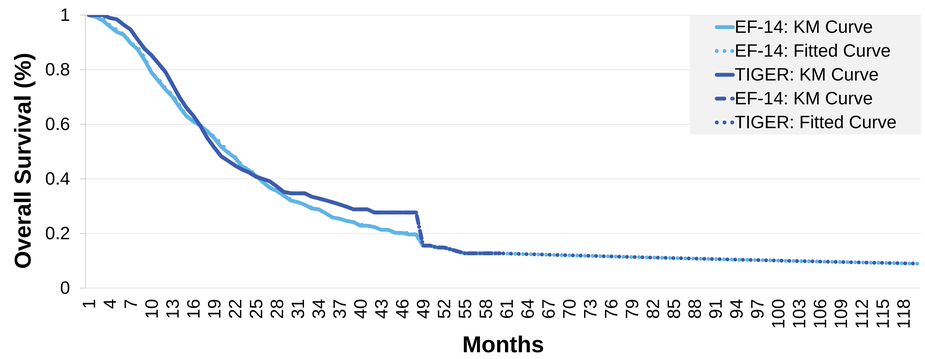
Table 1 summarizes the data sources and extrapolation methods for each arm.

METHODS – cont.

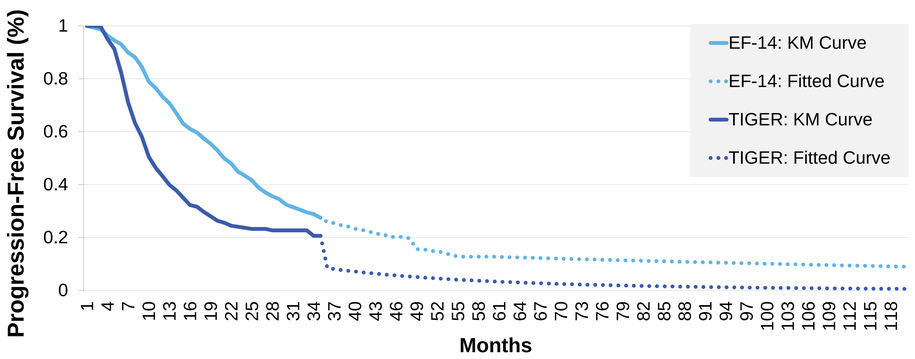
Year	TIGER Extrapolation	EF-14 Extrapolation
0–4	Kaplan-Meier data from TIGER trial	Kaplan-Meier data from EF-14 trial
4–5	Kaplan-Meier data from EF-14 trial	
5–15	Porter, K. R., et al.. (2010) Conditional Survival	
15–40	U.S. general population mortality rates	

Table 1: Overall Survival (OS) Extrapolation Approach: TIGER vs EF-14

- Deterministic sensitivity analyses assessed the impact of uncertainty in utilities, survival extrapolations, and time horizon (lifetime vs. 5-year)
- Compared to the EF-14 extrapolation by Guzauskas et al. (2018), which estimated lifetime benefits using only EF-14 data, this model incorporates real-world evidence from the TIGER study to provide a more practice-based estimate of long-term outcomes. Kaplan-Meier curves and fitted extrapolations from both EF-14 and TIGER are shown in Graphs 1 and 2, highlighting differences between observed survival and modeled projections.



Graph 1: Overall Survival (OS): EF-14 vs TIGER



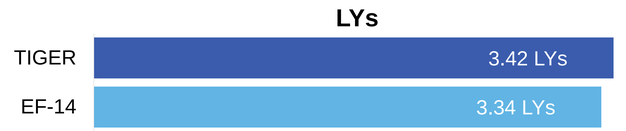
Graph 2: Progression-Free Survival (PFS): EF-14 vs TIGER

RESULTS

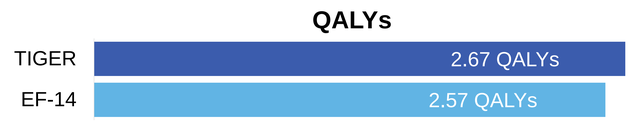
Patient Characteristics:	TIGER trial	EF-14
Median age	58 years	56 years
Male patients	64.1%	68%

Table 2: Patient Characteristics – TIGER vs EF-14

Survival Outcomes:



Graph 3: Estimated Life-Years (LYs) – TIGER vs EF-14



Graph 4: Estimated Quality-Adjusted Life-Years (QALYs) – TIGER vs EF-14

- The analysis showed that patients treated with TTFields plus temozolomide achieved gains in both life-years (Graph 3) and QALYs (Graph 4) compared to historical controls.
- Baseline characteristics of the TIGER population were comparable to EF-14, as summarized in **Table 2**. The observed improvements were consistent with prior clinical trial data, reinforcing the real-world effectiveness of TTFields.

CONCLUSION

- This analysis reinforces the clinical value of TTFields in newly diagnosed GBM, as shown in the EF-14 trial, and extends its applicability to real-world patients. The alignment in QALYs and life-years gained strengthens the evidence for TTFields as a standard component of GBM therapy and supports its broader use in routine clinical practice.

References

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