Q-TWiST Analysis Is Back in the Game in Oncology Clinical Trial Analysis: A Recent Trend

CO130

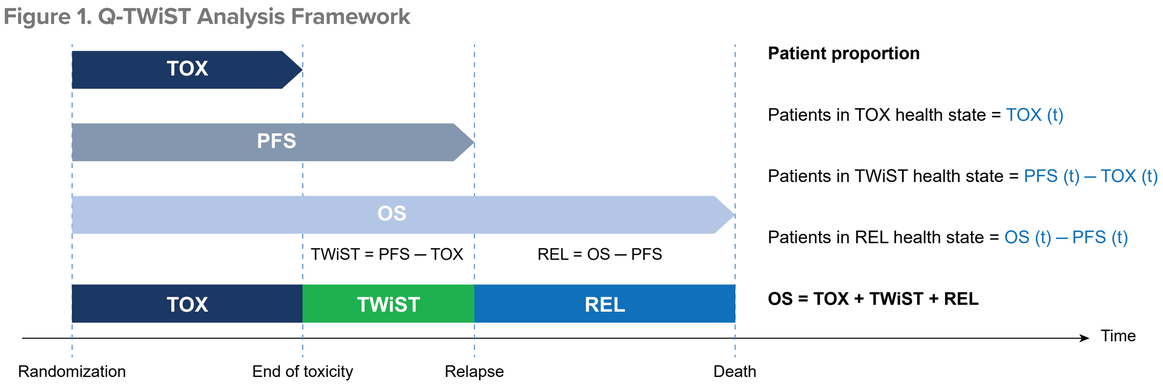
Leyla Mohseninejad,[1] Tushar Srivastava,[2] Raju Gautam,[2] Palash Purkayastha,[3] Keri Yang,[4] Vincent Lévy[5]

[1]BeiGene Netherlands BV, Schiphol, the Netherlands; [2]ConnectHEOR, London, UK; [3]ConnectHEOR, Delhi, India; [4]BeiGene USA Inc, San Mateo, CA, USA; [5]Hôpital Avicenne, AP-HP et Université Sorbonne, Paris Nord, France

INTRODUCTION

- Quality-adjusted time without symptoms or toxicity (Q-TWiST) is a clinical tool that helps assess the overall benefits and risks of oncology treatments by integrating progression, survival, treatment toxicities, and patient quality of life into a single metric (**Figure 1**)[1]
- Q-TWiST analysis assists in determining the proportion of the survival benefit that can be deemed valuable and high-quality time for patients. It considers disease progression and treatment side effects from the patient's perspective, complementing traditional data. Q-TWiST is applied to the trial analysis and does not require prediction of lifetime outcomes. The results of Q-TWiST analysis can help healthcare providers make informed treatment decisions[2]
- Although Q-TWiST was introduced more than 3 decades ago,[3] the information on its recent use in cancer therapies is limited
- The objective of this study was to analyze the use of Q-TWiST analysis in cancer therapies in recent years

Figure 1. Q-TWiST Analysis Framework



OS, overall survival; PFS, progression-free survival; REL, time from disease progression to death/censoring; TOX, time with toxicity; TWiST, time without symptoms of disease or toxicity.

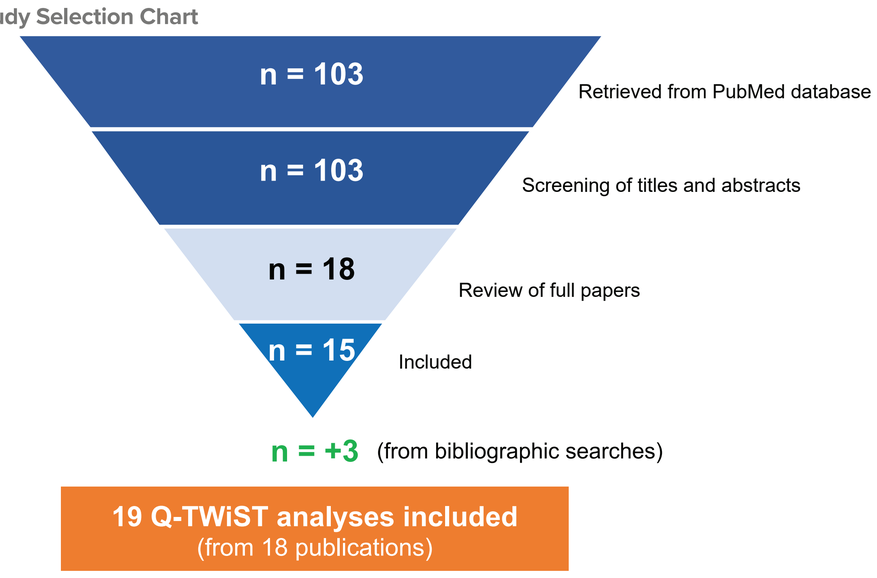
METHODS

- We conducted a targeted literature review to collect and analyze the recent evidence published on Q-TWiST analysis in oncology
- Searches were conducted in PubMed to retrieve papers published from January 2020 to May 2023 using Q-TWiST and cancer terms (ie, cancer, oncology, neoplasm, carcinoma, sarcoma, lymphoma, melanoma, myeloma, tumour) as the keywords
- Both full-text papers and conference abstracts were included
- Data for the following parameters were extracted: type of cancer, health states in Q-TWiST analysis, utility values for health states, sources of utility values
- Data were extracted by one reviewer, and the quality was checked by another reviewer to ensure accuracy. All data were analyzed qualitatively

RESULTS

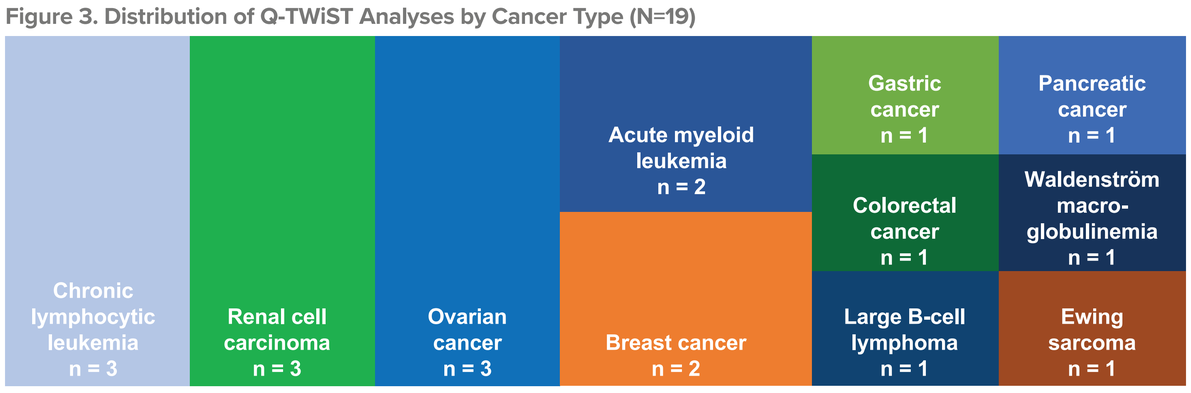
- Of the 103 citations retrieved from PubMed searches, 15 met the criteria and were included. Three additional citations were included from different sources (**Figure 2**)
- A total of 19 unique Q-TWiST analyses (reported in 18 studies/publications[4-21]) were included for analysis

Figure 2. Study Selection Chart



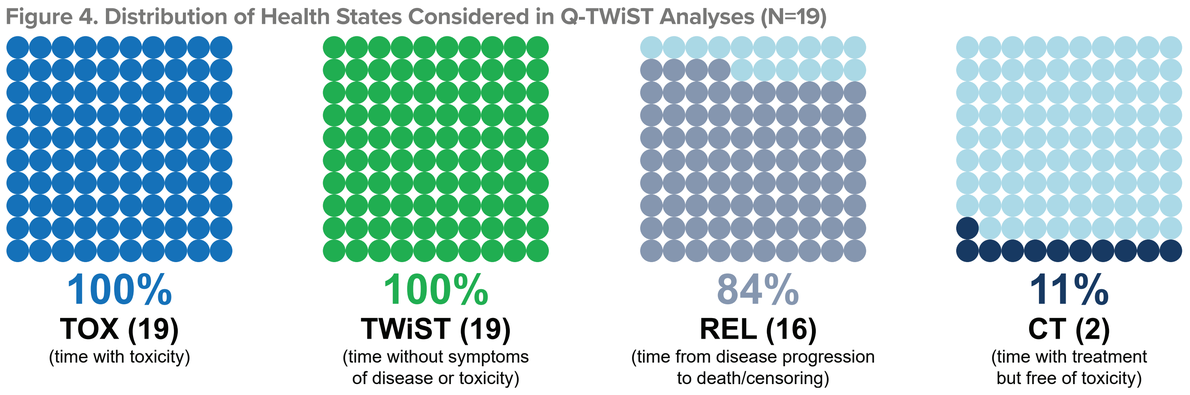
- The reported Q-TWiST analyses were most frequently associated with chronic lymphocytic leukemia, renal cell carcinoma, and ovarian cancer, each accounting for 16% (n=3 each) of the included studies (**Figure 3**)

Figure 3. Distribution of Q-TWiST Analyses by Cancer Type (N=19)



- The predominant health states used in Q-TWiST analyses were time with toxicity (TOX), time without symptoms of disease or toxicity (TWiST), and time from disease progression to death/censoring (REL) (**Figure 4**)

Figure 4. Distribution of Health States Considered in Q-TWiST Analyses (N=19)

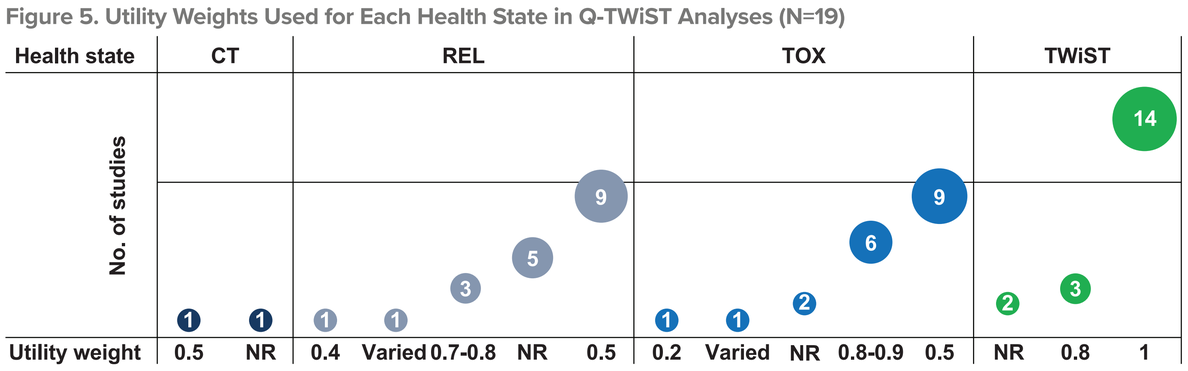


CONCLUSIONS

- The findings of this review reveal that Q-TWiST analysis has seen a resurgence in its application in oncology clinical trials in recent times
- Q-TWiST analysis overall appears to be a beneficial addition to conventional clinical trial endpoints, providing a comprehensive view of the patient's experience during cancer therapy. Its ongoing application and improvement will support more thorough and patient-centered evaluations of oncology treatments
- The results of Q-TWiST analysis, which integrates both the length and quality of survival in addition to treatment efficacy and toxicity, provide valuable insights that may help to inform clinical decision-making in the treatment of patients with cancer. Nevertheless, there is need to seek clinical opinion, and the analysis may be adjusted based on the condition (eg, acute vs chronic condition)

- The most frequently employed utility weights were 0.5 for the TOX health state (47% [n=9]), 1.0 for TWiST (74% [n=14]), and 0.5 for REL (47% [n=9]) (**Figure 5**)

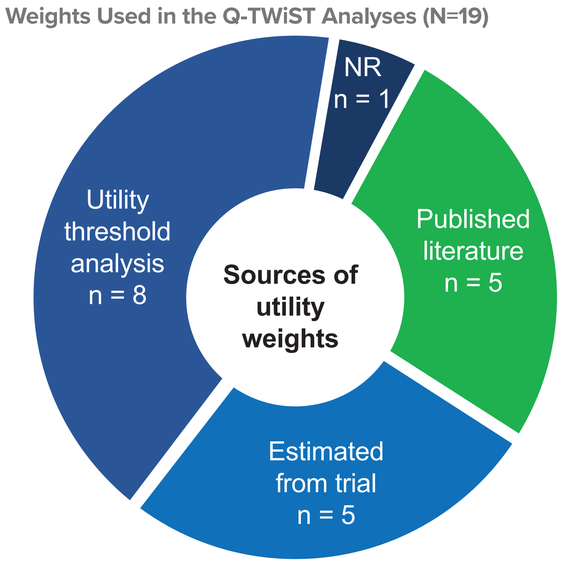
Figure 5. Utility Weights Used for Each Health State in Q-TWiST Analyses (N=19)



NR, not reported.

- The utility weights were employed from different sources, with nearly half (42% [n=8]) of the analyses employing utility threshold analysis (**Figure 6**)

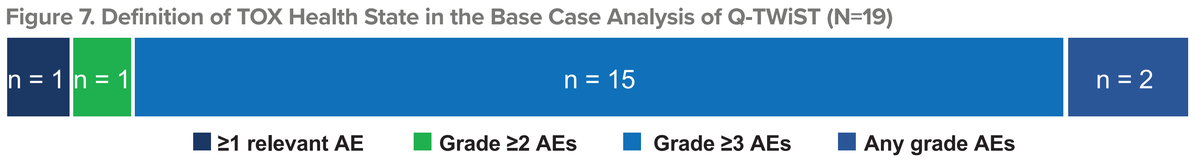
Figure 6. Sources of Utility Weights Used in the Q-TWiST Analyses (N=19)



NR, not reported.

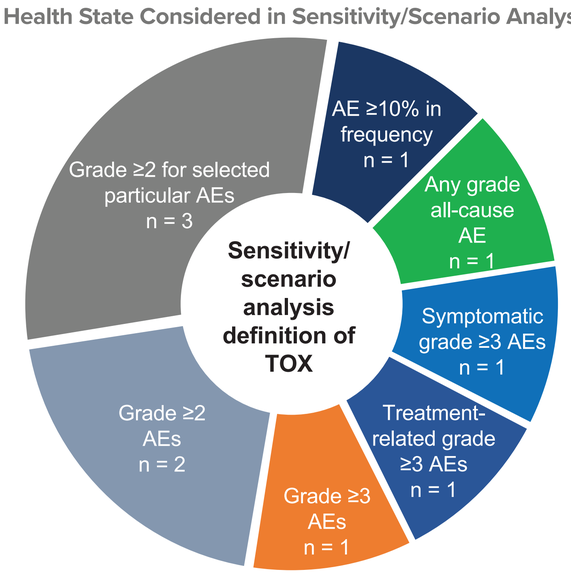
- The assumptions regarding the TOX health state play an important role in Q-TWiST analysis. In the base analysis, nearly 80% (n=15) of Q-TWiST analyses considered grade ≥3 adverse events in the TOX health state (**Figure 7**). However, several other definitions were explored in sensitivity/scenario analysis (**Figure 8**)

Figure 7. Definition of TOX Health State in the Base Case Analysis of Q-TWiST (N=19)



AE, adverse event.

Figure 8. Definition of TOX Health State Considered in Sensitivity/Scenario Analysis of Q-TWiST (n=10)



AE, adverse event.

REFERENCES

1. Solem CT, et al. *Expert Rev Pharmacoecon Outcomes Res*. 2018;18(3):245-253.
2. Tate WR, et al. *Psychooncology*. 2015;24:253-261.
3. Gelber RD, Goldhirsch A. *J Clin Oncol*. 1986;4(12):1772-1779.
4. Seymour JF, et al. *Blood*. 2021;138:3722-3724.
5. Levy V, et al. *Leukemia*. 2001;15:1466-1470.
6. Szarek M, et al. *Clin Genitourinary Cancer*. 2021;19(5):468.e468-468.e5.
7. Solem CT, et al. *Cancer*. 2020;126(19):4315-4321.
8. Oza AM, et al. *J Clin Oncol*. 2020;38:3494-3505.
9. Lin D, et al. Gastric *Cancer*. 2023;26(3):415-424.
10. Lee CH, et al. *Eur Urol Open Sci*. 2021;31:1-9.
11. Levy V, et al. *J Clin Epidemiology*. 2001;54:747-754.
12. Kersten MJ, et al. *Transplant Cell Ther*. 2023;29(5):335.e1-335.e8.
13. Dong S, et al. *Medicine*. 2021;100:51.
14. Cortes JE, et al. *J Hematol Oncol*. 2021;14(1):110.
15. Colombo N, et al. *Gynecol Oncol*. 2020;159(1):101-111.
16. Chen RC, et al. *Cancer*. 2020;126(24):5311-5318.
17. Barretina-Ginesta MP, et al. *Ther Adv Med Oncol*. 2022;14:17588359221126149.
18. Qin S, et al. *Future Oncol*. 2021;17(15):1923-1931.
19. Kindler HL, et al. *Cancer*. 2023;129(9):1411-1418.
20. Jerusalem G, et al. *Clin Breast Cancer*. 2022;22(4):326-335.
21. Huang M, et al. *Eur J Cancer*. 2022;177:45-52.

DISCLOSURES

LM: Employment: BeiGene; **TS, RG, PP**: Nothing to disclose; **KY**: Employment: BeiGene; Leadership: BeiGene; Stock or other ownership: BeiGene; Research funding: BeiGene; Travel, Accommodations and Expenses: BeiGene; **VL**: Consultancy, Honoraria, and Speakers Bureau: Amgen, Abbvie, AZ, BeiGene, BMS, Dova/Sobi, Gilead, Morphosys/Incyte, Seagen, Takeda, Karyopharms, pharmaEssentia, Genmab, Janssen, Sanofi.

ACKNOWLEDGMENTS

This study was sponsored by BeiGene, Ltd. Editorial assistance was provided by Nucleus Global, an Inizio Company, and supported by BeiGene.

CORRESPONDENCE: Leyla Mohseninejad, leyla.mohseninejad@beigene.com

Presented at ISPOR Europe 2023; November 12-15, 2023; Copenhagen, Denmark