TiNivo-2: A Phase 3, Randomized, Controlled, Multicenter, Open-Label Study to Compare Tivozanib in Combination With Nivolumab to Tivozanib Monotherapy in Patients With Renal Cell Carcinoma Following 1 or 2 Lines of Therapy in Which at Least One Line Has an Immune Checkpoint Inhibitor

Toni K. Choueiri,¹ Laurence Albiges,² Sumanta K. Pal,³ Hans Hammers,⁴ Rana R. McKay,⁵ Daniel Heng,⁶ Kathryn Beckermann,⁷ Vijay Kasturi,⁸ Robert Motzer⁹

¹Dana-Farber Cancer Institute, Boston, MA; ²Institut Gustave Roussy, Villejuif, France; ³Department of Medical Oncology and Therapeutics, City of Hope Comprehensive Cancer Program, Dallas, TX; ⁵UC San Diego, CA; ⁶Tom Baker Cancer Centre, Calgary, AB, Canada; ⁷Vanderbilt University Medical Center, Nashville, TN; ⁸AVEO Oncology, Boston, MA; ⁹Memorial Sloan Kettering Cancer Center, New York, NY

Background

- Renal cell carcinoma (RCC) is the eighth most common cancer in the United States.¹ Early-stage disease can commonly be asymptomatic, and 16% of patients present with metastatic RCC¹
- In the past decade, treatment options have been transformed with the advent of antiangiogenic small-molecule vascular endothelial growth factor receptor (VEGFR) tyrosine kinase inhibitors (TKIs) in combination with checkpoint inhibitor immunotherapy²
- There is limited data to guide treatment sequencing after frontline immunotherapy combinations
- The current standard of care after progression on frontline combination immunotherapy is VEGFR-targeted monotherapy²

Study Rationale

The VEGFR Pathway and Tivozanib

- The VEGFR pathway plays a critical role in angiogenesis, which is an essential process in endothelial cell proliferation, migration, and survival in cancer³
- Tivozanib is a potent, highly selective VEGFR TKI that inhibits all 3 VEGFRs (VEGFR-1, -2, and -3)²
- In a phase 3 clinical trial (NCT02627963), treatment with tivozanib monotherapy was safe and efficacious in patients with advanced RCC⁴
- On March 10, 2021, tivozanib was granted US Food and Drug Administration approval and is indicated for the treatment of adult patients with relapsed or refractory advanced RCC following ≥ 2 prior systemic therapies⁵

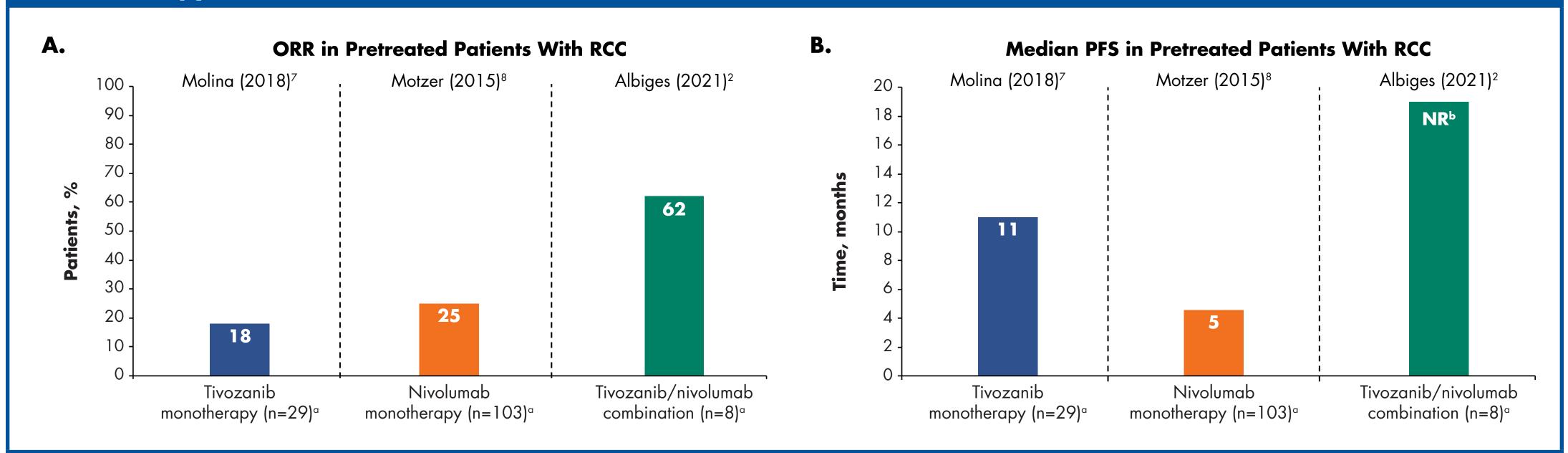
Rationale for Tivozanib and Nivolumab Combination Therapy

- The addition of nivolumab, an anti-programmed cell death protein 1 (anti–PD-1) antibody, to tivozanib is a treatment strategy of interest because:
- Tivozanib has been shown to reduce production of regulatory T cells,⁶ thus potentially facilitating immune-mediated responses
- Nivolumab blocks the immune checkpoint protein PD-1 from interacting with programmed death ligand 1²
- The selectivity and favorable tolerability of the VEGFR TKI tivozanib² may allow it to be used more readily as a combination therapy with an immune checkpoint inhibitor (ICI)
- These mechanisms may act synergistically to remove inhibition of the immune response that mediates antitumor activity²
- In the TiNivo phase 1/2 clinical trial (NCT03136627) in patients with RCC who were treatment naive or who received prior therapy, tivozanib in combination with nivolumab demonstrated promising antitumor efficacy and a tolerable adverse event (AE) profile²
- An objective response rate (ORR) of 56% (95% CI, 36.5%-75.5%) was observed, with a disease control rate of 96% (n=24) and median progression-free survival (PFS) of 18.9 months (95% CI, 16.4 months-not reached)²
- In a subanalysis of patients who received prior treatment for RCC, the ORR with tivozanib and nivolumab combination therapy was 62% (Figure 1A) and median PFS was not reached (Figure 1B)²

- 20 patients (80%) experienced ≥ 1 grade 3/4 treatment-related AE, with the most common being hypertension (n=13 [52%])²

- Previous data from separate studies have shown that tivozanib or nivolumab monotherapy in previously treated patients resulted in an ORR of 18% and 25% (Figure 1A) and PFS of 11.0 and 4.6 months (Figure 1B), respectively^{7,8}
- These results support further investigation in the phase 3 trial TiNivo-2, which is evaluating tivozanib in combination with nivolumab vs tivozanib monotherapy in patients with advanced RCC that has progressed following 1-2 lines of therapy including an ICI

Figure 1. Antitumor Activity in Pretreated Patients. (A) ORR was higher with tivozanib/nivolumab combination therapy than with either single agent alone; (B) PFS was longer with tivozanib/nivolumab combination therapy than with either monotherapy alone



ORR, objective response rate; PFS, progression-free survival; RCC, renal cell carcinoma Data from separate studies

^b The tivozanib/nivolumab combination arm did not reach the limits of PFS during the trial, which followed up patients for 19 months.

Objective

• To compare the efficacy and safety of tivozanib and nivolumab combination therapy with those of tivozanib monotherapy in patients with advanced RCC that has progressed following 1 to 2 lines of therapy including an ICI

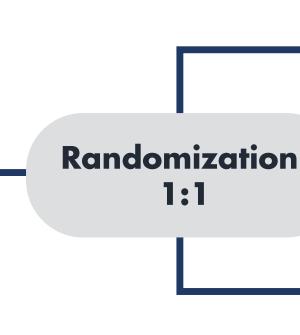
Study Design

- This is a phase 3, randomized, controlled, multicenter, open-label, global, clinical trial (NCT04987203)
- Approximately 326 patients will be randomized 1:1 to receive tivozanib in combination with nivolumab or tivozanib monotherapy (Figure 2)

Figure 2. Study Design of TiNivo-2

N=326

Histologically/cytologically confirmed recurrent or mRCC ECOG PS 0-1 1 or 2 prior lines of therapy, including an immmunotherapy Stratified by IMDC risk score and prior



The growing body of evidence in combination trials suggest that the risk-benefit may be optimized at a reduced dose in the combination. 1L, first line; 2L, second line; ECOG PS, Eastern Cooperative Oncology Group performance status; IMDC, International Metastatic RCC Database Consortium; IV, intravenous; mRCC, metastatic renal cell carcinoma; PO, orally; Q4W, every 4 weeks; QD, once daily; Kl, tyrosine kinase inhibitor.

Endpoints

• Study endpoints are shown in **Table 1**

Table 1. Study Endpoints

Primary endpoints

lines of therapy

- PFS assessed by blinded independent radiological review (until PD [≈30 months] as measured by RECIST v1.1) Secondary endpoints
- OS (from screening until death [\approx 42 months])
- ORR (measured as CR+PR; from screening until PD [\approx 30 months] as measured by RECIST v1.1) DOR (from screening until PD or death [\approx 30 months])
- Safety and tolerability (from screening to follow-up visit [30 days after last dose ±7 days]) **Exploratory endpoints**

HRQOL by FKSI-DRS and EORTC QLQ-C30

PK of tivozanib

CR, complete response; DOR, duration of response; EORTC QLQ-C30, European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 items; FKSI-DRS, Functional Assessment of Cancer Therapy–Kidney Symptom Index Disease-Related Symptoms; HRQOL, health-related quality of life; ORR, objective response rate; OS, overall survival; PD, progressive disease; PFS, progression-free survival; PK, pharmacokinetics; PR, partial response; RECIST, Response Evaluation Criteria in Solid Tumors.

Enrollment Criteria

• Key enrollment criteria are shown in **Table 2**

Table 2. Key Inclusion and Exclusion Criteria

Inclusion criteria

Age \geq 18 years Histologically or cytologically confirmed RCC with a clear cell component >1 prior line of therapy with an ICI in the metastatic setting Radiographic disease progression during or following ≥6 weeks of treatment with an ICI for locally advanced or mRCC with a clear cell >2 prior lines of therapy in the advanced or metastatic setting component either in 1L or 2L setting Patients must have recovered from the AEs of prior therapy or returned History of life-threatening toxicity related to prior immune therapy to baseline

Measurable disease per RECIST v1.1 ECOG PS 0-1

1L, first line; 2L, second line; AE, adverse event; BP, blood pressure; CNS, central nervous system; ECOG PS, Eastern Cooperative Oncology Group performance status; ICI, immune checkpoint inhibitor; mRCC, metastatic renal cell carcinoma; mTOR, mechanistic target of rapamycin; RECIST, Response Evaluation Criteria in Solid Tumors

Study Protocol and Procedures

4-week treatment cycles (2+ cycles required for assessment) Combination therapy (n=163) Tivozanib 0.89° mg PO QD for 21 days on/7 days off Nivolumab 480 mg IV Q4W Monotherapy (n=163) Tivozanib 1.34 mg PO QD for 21 days on/7 days off canib from 1.34 to 0.89 mg when combined with nivolumab. This amendment was not the result of any clinical outcomes seen in the conduct of the TiNivo-2 trial, which has enrolled 2 patients thus far.

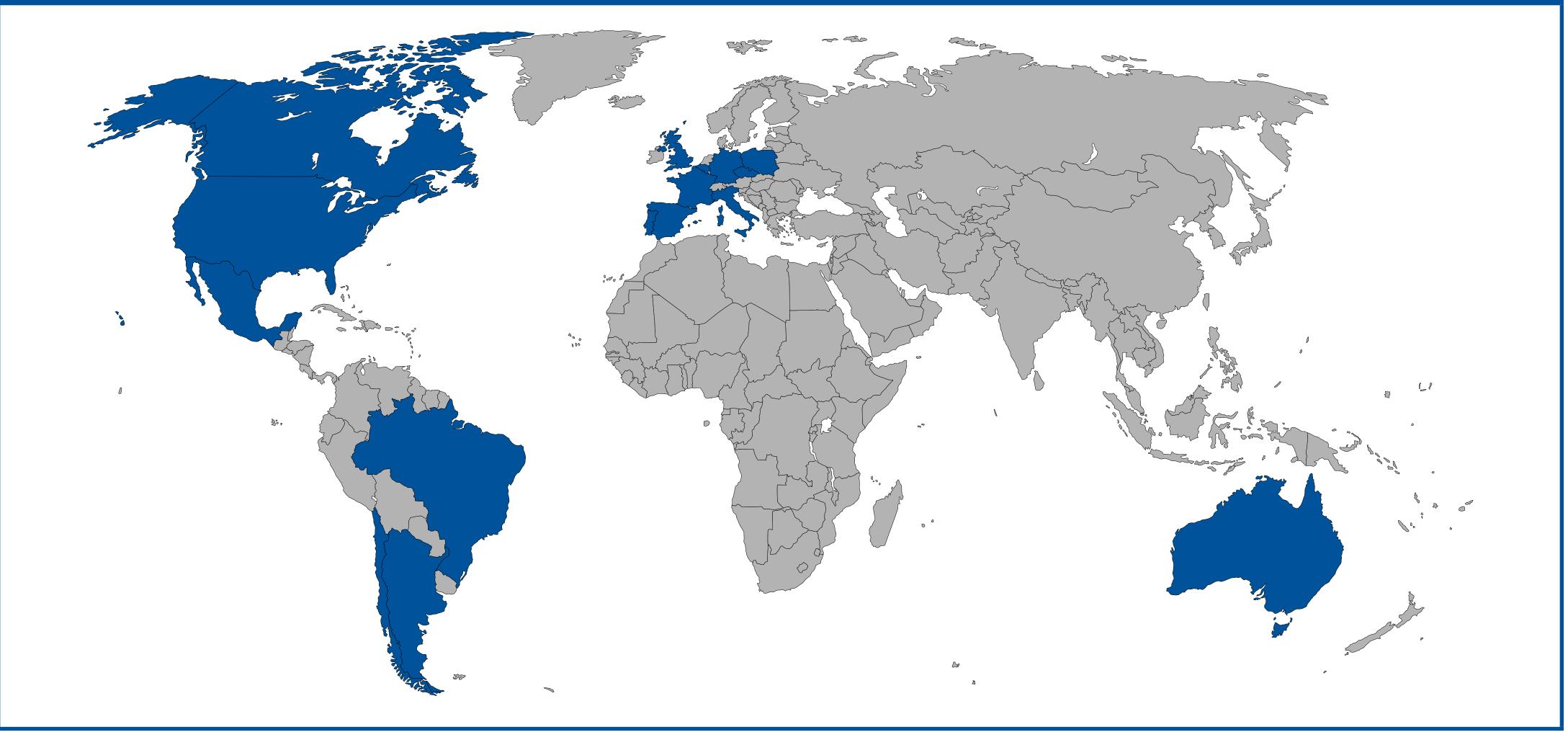
Exclusion criteria

Prior treatment with tivozanib

Active, known, or suspected autoimmune disease Known CNS metastases other than stable, treated brain metastases Uncontrolled hypertension: systolic BP >150 mm Hg or diastolic BP >100 mm Hg while receiving ≥ 2 antihypertensive medications

Study Sites

Figure 3. TiNivo-2 Study Sites by Region



- treatment after prior immunotherapy combination regimens²
- with an ICI such as nivolumab

References

- 1. Tenold M, et al. Am Soc Clin Oncol Educ Book. 2020;40.
- 2. Albiges L, et al. Ann Oncol. 2021;32.
- 3. Niu G, et al. Curr Drug Targets. 2010;11.
- 4. Rini B, et al. Lancet Oncol. 2020;21
- 5. US Food and Drug Administration. Accessed October 14, 2021. tivozanib-relapsed-or-refractory-advanced-renal-cell-carcinoma
- 6. Pawlowski N, et al. Cancer Res. 2013;73. Abstract 3971. 7. Molina AM, et al. Eur J Cancer. 2018;94.
- 8. Motzer RJ, et al. N Engl J Med. 2015;373:1803-1813.

• The study is actively enrolling and expected to be conducted in approximately 200 sites across the United States, Argentina, Australia, Belgium, Brazil, Canada, Chile, Czech Republic, France, Germany, Italy, Mexico, Poland, Portugal, Spain, and United Kingdom (Figure 3)

Summary

Immunotherapy combinations have become the standard of care in the 1L treatment of advanced RCC, and few data exist on sequencing

• Tivozanib is a potent and selective VEGFR inhibitor with demonstrated single-agent activity and a favorable toxicity profile⁴

Because of tivozanib's effect on reducing regulatory T cells,⁶ it may have a synergistic effect on the tumor microenvironment when combined

• In the phase 1/2 TiNivo clinical trial, tivozanib combination therapy with nivolumab has demonstrated enhanced efficacy and a tolerable safety profile in patients with treatment-naive and pretreated advanced RCC²

This phase 3 study (NCT04987203) will compare the efficacy and tolerability profile of tivozanib and nivolumab combination therapy vs that of tivozanib monotherapy in patients with advanced RCC that progressed after 1L or 2L treatment following an ICI

https://www.fda.gov/drugs/resources-information-approved-drugs/fda-approves-

Acknowledgments

This study was sponsored by AVEO Oncology. Medical writing and editorial assistance was provided by Clara Huesing, PhD, of SciMentum, Inc, a Nucleus Holding Ltd company, and was funded by AVEO Oncology.

> Copies of this poster obtained through G (Quick Response) code are for persona use only and may not be reprod



TPS405