A phase I-II study of niacin in patients with newly diagnosed glioblastoma: safety and interim phase II analysis

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Aims and scope

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Abstract

Purpose

Survival of patients with glioblastoma (GB) treated with standard of care (SOC) surgery, radiotherapy, and temozolomide is 15 months with progression free survival at 6 months (PFS-6 M) of 53.9%. In vivo studies showed increased survival in mice with GB treated with niacin. This is a first in human Phase I-II study aiming to evaluate safety and efficacy of controlled-release niacin (NiacinCRT ™) added to SOC.

Methods

Patients 18–75 years old with newly diagnosed glioblastoma eligible for SOC treatment were included. Phase I evaluated intra-patient dose escalation of niacin (500–3000 mg/d) to determine dose limiting toxicity (DLT), maximum tolerated dose (MTD) and recommended phase II dose

(RP2D). Phase II aims to determine if niacin adds ≥ 20% absolute increase in PFS-6 M over historical controls. Interim/futility analysis was planned when 24 patients become evaluable for PFS-6 M. The study would stop if the conditional power (one-sided Z test) < 20% or futility index > 80%.

Results

Phase I included 15 patients; median age: 57 years (37–68), 40% women, and 47% with MGMT promoter methylated. The most common side effect was flushing (10/15; 9 grade 1). Two DLTs occurred at 2,500 mg/d niacin (grade 3 thrombocytopenia and hyperbilirubinemia). Niacin dose escalated up to 2000 mg/d is the ongoing RP2D. Interim analysis by central radiology review reported PFS-6 M of 82.3% (CI95% 82.14–82.46%).

Conclusion

The MTD dose of niacin added to first line treatment in patients with GB is 2000 mg/d. The interim analysis already showed an absolute increase in PFS-6 M of 28%.

Trial registration number

(1) Local ethics board approval - HREBA cc 20–0402. (2) Clinicaltrials.gov - NCT04677049. Registered 15 Dec 2020.

Data availability

The protocol is available. Anonymized summarized original data can be made available upon reasonable request to (mailto: gloria.roldanurgoiti@albertahealthservices.ca): https://www.albertahealthservices.ca//

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Contributions

All authors contributed to the design of the study AND drafting/review of the intellectual content AND final approval of the version to be published (Roldan Urgoiti G, de Robles P, Tsang RY, Willson M, Ghosh S, Faruqi M, Lim G, Loewen SK, Nordal R, Cairncross G, Leckie C, Poon CC. Yong VW. Additionally, Ghosh S perfomed the statistical analysis and Willson M did the central radiology review.

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Ethics declarations

Ethical approval

Good Clinical Practice (ICH-GCP) Guidelines under a Clinical Trial Application (CTA) for a natural health product (NHP) with Health Canada. It obtained local ethics board approval (HREBA cc 20–0402) before starting. All patients signed informed consent. Data Safety Monitoring Committee (DSMC) meetings were planned per protocol at the completion of phase I, after the interim analysis and at the end of phase II. The trial is registered in clinicaltrials.gov as NCT04677049.

Consent to participate

Written informed consent was obtained from all individual participants included in the study.

Consent to publish

All authors have consented to publish this paper. This material was accepted as poster in the Canadian Cancer Research Conference, Calgary AB, Nov 2–4, 2025.

Competing interests

The authors declare no competing interests.

Additional information

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