CNS 2018 ANNUAL MEETING
HOUSTON, TEXAS
OCTOBER 6–10, 2018

# An Analysis of the Impact of iMRI in Newly Diagnosed Isocitrate Dehydrogenase I (IDH-1) Mutant Glioblastomas

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## Introduction

Isocitrate dehydrogenase I (IDH1) mutant glioblastomas have been shown to respond more favorably to gross total resection (GTR). The role of intra-operative magnetic resonance imaging (iMRI) in the resection of IDH-1 mutant glioblastoma has not been studied. This study aimed to assess impact of iMRI on survival in isocitrate-dehydrogenase-1 (IDH-1) mutant glioblastoma.

## Methods

A multicenter database (2009-2018) identified newly diagnosed IDH-1 mutant glioblastomas. Kaplan-Meier analysis assessed overall survival (OS) and progression-free survival (PFS) and logistic regression was performed to calculate odds of GTR determinations. American Society of Anesthesiology (ASA) scores were used as surrogate for performance status. iMRI was performed using a movable ceiling-mounted high-field magnet at operating surgeon's preference.

## Results

IDH-1 status was available for 428 resected newly diagnosed glioblastomas, 33 were mutated, and 29 resected). Overall, IDH-1 mutants had improved OS (14.93 versus 31.47 months, p=.003), and PFS (7.37 versus 20.17 months, p=.003) compared to wildtype cases. In 29 patients with IDH -1 mutations, use of iMRI led to increased OS from 11.83 (n=8, non-iMRI) to 58.47 months (n= 21, iMRI, p=.02; HR 0.270 [0.084, 0.872]), increased PFS (6.77 to 23.43 months, p=.001; HR 0.185 [0.060, 0.577]), and higher rates of GTR (6/20, compared to 0/7 in the non-iMRI group, 2 unknown). IDH1-mutants who received adjuvant temozolomide and radiation (Stupp protocol, n=18) had significantly greater OS (p<.001, median 44.03 vs 6.77 months, HR = 0.053 [0.011, 0.264]) and PFS (P<.0001, median 23.43 vs 4.30 months, HR = 0.090 [0.022, 0.363].

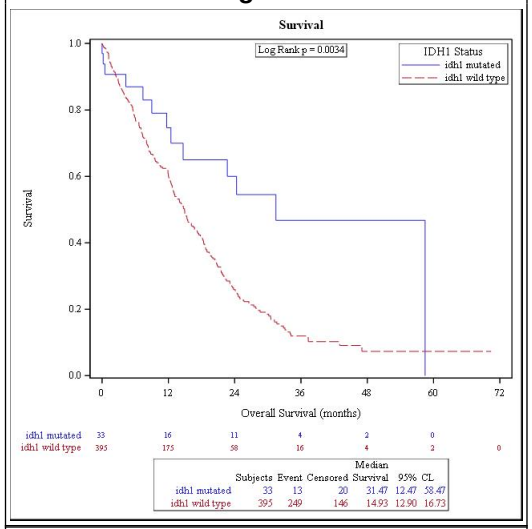
Patients with IDH-1 tumors were significantly younger than those with wildtype tumors (median age 54.6 (sd 17.7) vs 61.6 (sd 12.5); p=.003).

IDH-1 status was not an independent predictor of GTR (p=.67, OR = 1.306 [0.389, 4.381]) after controlling for age, ASA, and iMRI. iMRI was an independent predictor of GTR after controlling for age, ASA, and IDH-1 (p=.02, OR 2.637 [1.174, 5.927]).

**Financial Support**

Michael Chicoine received funding from 1) IMRIS Inc. for an unrestricted educational grant to support an iMRI database and outcomes analysis project, the IMRIS Muliticenter intraoperative MRI Neurosurgery Database (I-MiND), 2) The Head for the Cure Foundation, 3) Mrs. Carol Rossfeld and The Alex & Alice Aboussie Family Charitable Foundation. REDCapTM database supported by Clinical and Translational Science Award (CTSA) Grant [UL1 TR000448] and Siteman Comprehensive Cancer Center and

## Figure 1

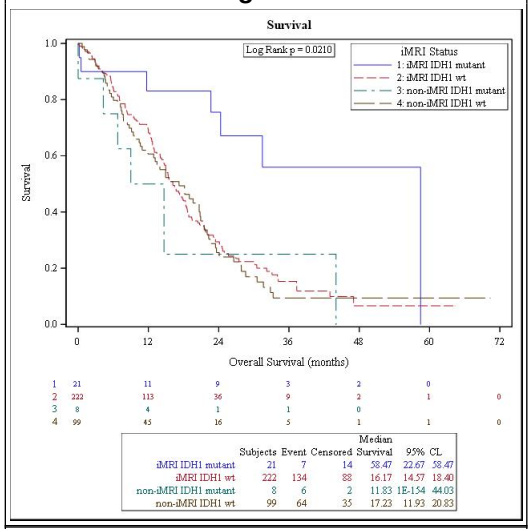



Kaplan-Meier plots showing OS and PFS for patients with IDH1 mutants and wild-type tumors

## Conclusions

The use of iMRI during resection for IDH-1 mutant glioblastomas led to increased OS and PFS and greater extent of resection. Stupp protocol may be particularly benefecial in IDH1 mutant tumors. iMRI may be of particular benefit in IDH1 mutants due to improved extent of resection.

## Figure 2




Kaplan-Meier plots showing OS and PFS for patients who did and did not receive iMRI and underlying IDH1 mutation status

**Participating Institutions**

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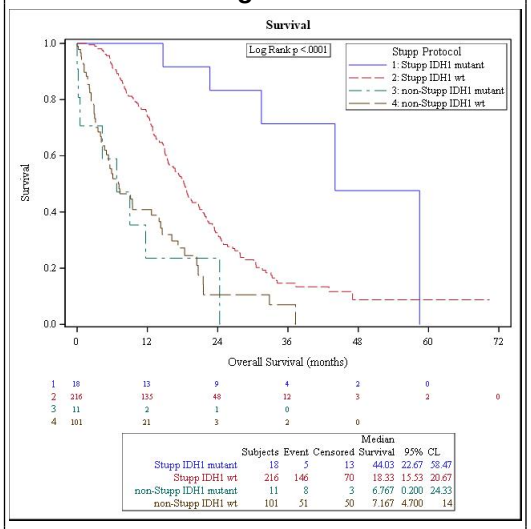
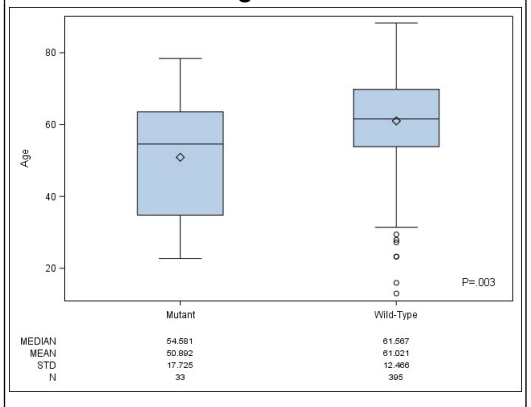
## Figure 3




Kaplan-Meier plots showing OS for patients who received adjuvant temozolomide and radiation (Stupp protocol) given IDH1 status

## Figure 4




Age of patients with IDH-1 mutant tumors compared to wild-type

**References**

Available Upon Request