A Liquid Biopsy Detects GBM Recurrence

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Introduction

Glioblastoma (GBM) is among the most malignant cancers. Current therapeutic options are palliative, involving surgical removal of the primary tumor followed by chemo and radio-therapy. Although the primary tumor is typically easily identified by Magnetic Resonance Imaging (MRI), standard treatment modalities such as surgery, radio-chemotherapy, immunotherapy and others may induce imaging changes which confounds the diagnosis of tumor recurrence. Standard MRI cannot conclusively differentiate between true GBM recurrences, pseudo progression (PP), radiation necrosis (RN) or all three. Although some groups have reported success using PET and other advanced imaging modalities, these modalities are neither routinely available nor regularly reimbursed by insurance. A brain biopsy is required to make the diagnosis and this is sometimes declined by patients.

Learning Objectives

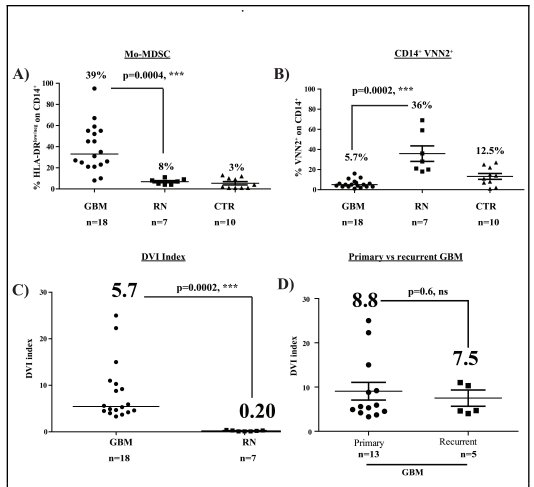
Universtand how DVI can differentiate GBM recurrence from RN.

Methods

Using a novel blood-based liquid biopsy, we have been able to longitudinally follow eight patients following surgical removal of GBM. Using an index which corresponds to the ratio between quantification of monocytic Myeloid-Derived Suppressor Cells (Mo-MDSC) and CD14+ VNN2+ cells in the peripheral blood of patients (the DVI index), we have been able to assess recurrence versus remission in all patients. While a DVI =1 is indicative of tumor recurrence, a DVI < 1 suggests remission or development of RN.

Results

DVI > 1 correctly predicted 10 biopsy-confirmed recurrences in 8 patients prior to development of symptoms. Only 4 of these cases demonstrated clear tumor progression based on the radiologists opinion, while 3 were thought to be consistent with RN, and 3 were “equivocal” according to the radiologist. Similarly, 3 patients with DVI < 1 had biopsy proven RN or PP despite radiological diagnosis of “tumor progression” according to radiologists.



Presence of HLA-DR and VNN staining on CD14+myeloidcells can distinguish recurrent GBM from RN patients.

Conclusions

This minimally invasive, economically viable test could be used to monitor patient’s response to treatment following GBM on a recurring basis to assess response to treatment or recurrence.

References: Soler D, Young AB, Cooper KD, Barnholtz-Sloan, JS, Gittleman H, McCormick TS, and **Sloan AE**: The ratio of HLA-DR and VNN2+ expression on CD14+ myeloid derived suppressor cells can distinguish glioblastoma from radiation necrosis patients. J Neurooncol. 2017 Aug;134(1):189-196. doi: 10.1007/s11060-017-2508-7. Epub 2017 May 27. PMID: 28551851.