

Introduction

Progressive multifocal leukoencephalopathy (PML) is a rare opportunistic infection of the central nervous system (CNS) that can occur in patients with multiple sclerosis (MS) after exposure to natalizumab. Patients receiving natalizumab every four weeks are measured for the JC virus (JCV) antibody index which relates to the risk of developing PML. Elevated JCV antibody indices are associated with elevated risk of PML. Per our clinical protocol, the JCV antibody index is monitored every six months. Patients with elevated indices can adjust their natalizumab dosing to every eight weeks to reduce their exposure to natalizumab and possibly reduce their risk of developing PML.

Purpose

Our goal is to determine if there is a statistically significant change in serum JCV antibody index in MS patients receiving natalizumab when changing the infusion frequency from four to eight weeks.

Methods

We conducted a retrospective chart review of patients with the diagnosis of multiple sclerosis who received natalizumab between the ages of 18-80 (inclusive) at Rush University Medical Center Multiple Sclerosis Center. 509 charts from April 2011 until September 2015 were examined. Data was analyzed via a paired t-test.

Figure

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|-------------------------------------------------------------|-------------|
| Age at baseline ^a , mean (SD) | 46.5 (9.9) |
| Gender, n (%) | |
| Male | 16 (26.2) |
| Female | 45 (73.8) |
| Race, n (%) | |
| White | 42 (70) |
| Black | 10 (16.7) |
| Hispanic | 6 (10) |
| Asian | 1 (1.7) |
| Other | 1 (1.7) |
| Duration of disease at baseline, median (IQR ^b) | 156 (89) |
| Duration of treatment at baseline, median (IQR) | 54.5 (45.5) |
| JCV value at baseline, mean (SD) | 2.2 (1.09) |
| JCV value at visit 1 ^c , mean (SD) | 2.11 (1.1) |
| JCV value at visit 2 ^d , mean (SD) | 1.8 (1.01) |
| Number of days between baseline and visit 1, median (IQR) | 178 (49) |
| Number of days between baseline and visit 2, Median (IQR) | 508 (297) |

Data

61 patients were included in the study. Patients were excluded if they did not have recorded JCV index values, were under the age of 18, did not receive natalizumab, did not have data reflecting the change of frequency of natalizumab infusions or if they developed PML. The median number of days between baseline and first observation after frequency change was 178 (Interquartile range 49) and between baseline and last observation was 508 (IQR^b 297). The mean JCV value at baseline was 2.2 ± 1.09 , 2.11 ± 1.1 at first observation and 1.8 ± 1.01 at last observation. There was no significant change in JCV value from baseline to first observation, -0.1 ± 0.6 ($p=0.2$), but there was a significant decrease in JCV value from baseline to last observation, 0.35 ± 0.59 , ($p=0.0001$) when patients received natalizumab every eight weeks.

Conclusion

This study suggests that decreasing the frequency of natalizumab infusions from every four weeks to every eight weeks results in a significant decrease in the JCV antibody index which may lower the risk of developing PML. Further study is needed to determine its clinical significance.