(S109) SMOKING NEGATES PLATFORM THERAPY IN MULTIPLE SCLEROSIS
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Background: Brain atrophy is a marker of current neurologic impairment and correlates with future disability. Cigarette smoking is associated with poorer disease prognosis, including greater lesion volume and volume loss (cerebral atrophy). Disease-modifying agents (DMAs) slow the rate of brain volume (BV) loss. To date, the relative effects of, and associations between, BV changes in patients with relapsing-remitting multiple sclerosis (RRMS) who smoke and who use DMAs have not been reported. Objectives: To evaluate BV changes in smokers with RRMS versus those on DMAs. Methods: A literature review was performed using the keywords brain atrophy, brain parenchymal fraction (BPF), brain volume (BV), and smoking from 1999 to 2010. BPF and BV change were analyzed in untreated patients and during therapy with interferon beta (IFNβ) or glatiramer acetate (GA). Change in BPF or BV was also studied in patients with a history of smoking. Results: BPF loss occurs at a faster rate in smokers than in nonsmokers with RRMS. Healy et al. showed that BPF declines 0.3% per year in nonsmokers versus 0.4% per year in smokers (who were evenly matched between treated and untreated). Khan et al. found that the rate of brain atrophy in untreated MS patients was 0.95% versus 0.46% to 0.64% in patients on DMAs (0.31%–0.49% reduction). Rudick et al. reported that patients taking weekly IFNβ-1a had a 0.69% BPF loss in the first year, which then stabilized to a 0.38% BPF loss in the second and third years (0.18% reduction vs. placebo). Similar trends were found by Frank et al. in a 3-year trial with IFNβ-1b. Patients lost 1.68% BV (mean, 0.56% per year) (0.04%–1.44% reduction vs. placebo). A small 2-year trial of GA showed BV loss of 0.6% per year (1.2% reduction). Conclusions: Smoking, with a 0.1% less loss of BPF per year, appears to lessen or negate the protective effects of DMAs, with 0.04% to 1.44% less loss of BPF per year. The mechanism by which cigarette smoke affects MS is not entirely understood but is likely multifactorial. In animal models, cigarettes increase levels of metalloproteinase 9 and free oxygen radicals, and may cause axonal degradation via nitric oxide. Products of smoking may also bind to the aryl hydrocarbon receptor on immune cells activating Th17 cells, worsening autoimmunity.

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