

A prospective study of prenatal mercury exposure from maternal dental amalgams and autism severity

David A. Geier^{1,2}, Janet K. Kern^{3,4}, and Mark R. Geier^{5*}

¹Institute of Chronic Illnesses, Inc., Silver Spring, Maryland, USA; ²CoMeD, Inc., Silver Spring, Maryland, USA; ³Genetic Consultants of Dallas, Allen, Texas, USA; ⁴University of Texas Southwestern Medical Center, Dallas, Texas, USA; ⁵The Genetic Centers of America, Silver Spring, Maryland, USA, *Email: mgeier@comcast.net

Dental amalgams containing 50% mercury (Hg) have been used in dentistry for the last 150 years, and Hg exposure during key developmental periods was associated with autism spectrum disorders (ASDs). This study examined increased Hg exposure from maternal dental amalgams during pregnancy among 100 qualifying participants born between 1990–1999 and diagnosed with DSM-IV autism (severe) or ASD (mild). Logistic regression analysis (age, gender, race, and region of residency adjusted) by quintile of maternal dental amalgams during pregnancy revealed the ratio of autism:ASD (severe:mild) were about 1 (no effect) for ≤ 5 amalgams and increased for ≥ 6 amalgams. Subjects with ≥ 6 amalgams were 3.2-fold significantly more likely to be diagnosed with autism (severe), in comparison to ASD (mild), than subjects with ≤ 5 amalgams. Dental amalgam policies should consider Hg exposure in women before and during the child-bearing age and the possibility of subsequent fetal exposure and adverse outcomes.

Key words: Asperger's syndrome, autism, developmental delay, neurodevelopmental disorder

INTRODUCTION

The practice of using amalgams (which generally contain 50% mercury) in dentistry has existed for over 150 years. As of mid-2008, the US Food and Drug Administration (FDA) has declined to classify the medical-device safety of amalgams used in dentistry. The American Dental Association maintains that the mercury in amalgam is safe and that the mercury does not leak (Edlich et al. 2007).

Yet, the research evidence suggests that there is significant amount of elemental leaching and mercury vapor release from amalgams (Cohen and Penugonda 2001) and that this liberated mercury is absorbed by several body tissues (Mutter et al. 2004, Edlich et al. 2007). As a result, dental amalgams are a significant source of mercury body burden, as studies in animals and humans show (Mutter et al. 2007). For example, Guzzi and coworkers (2006) found that, on autopsy, total mercury levels were significantly higher in sub-

jects with a greater number of amalgam surfaces (>12) compared with those who had fewer (0–3), in all types of tissue. These authors also reported that the greater the number of amalgams, the greater the likelihood that mercury would be found in the brain. In regard to amalgam bearers, other investigators have reported an approximate 2- to 5-fold increase of the mercury level in blood and urine as well as a 2- to 12-fold increase of the mercury concentration in several body tissues (Mutter et al. 2007). Also, mercury from maternal amalgam fillings leads to a significant increase of mercury concentration in the tissues and the hair of fetuses and newborn children. Furthermore, placental, fetal, and infant mercury body burden correlates with the numbers of amalgam fillings of the mothers (Mutter et al. 2007, Palkovicova et al. 2008). Finally, mercury levels in amniotic fluid and breast milk correlate significantly with the number of maternal dental amalgam fillings (Mutter et al. 2007).

The overall importance of dental amalgams, particularly maternal dental amalgams, significantly contributing to fetal and early infant mercury body-burden stems from the fact that recent studies have postulated that mercury exposure can cause immune, sensory,

Correspondence should be addressed to M.R. Geier,
Email: mgeier@comcast.net

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