The Thimerosal Insinuation

by Anthony Scalzo, MD & Kenneth Haller, MD

From a toxicology perspective mercury has long held a position of prominence as a heavy metal toxicant. From the era of calomel poisoning and acrodynia with one of the first reports by Carithers[1], through the environmental disaster of Minamata Bay, Japan, and into our current times with concerns over mercury in our seafood there has been a long debate over mercury's role, if any, in autism. There has been a great deal of literature and some research that has emerged.

Potential sources of mercury include dental amalgams thought to contribute in the range of 2-20 micrograms per day and yet there is no substantive evidence that this exposure has lead to any known neurological injury. Seafood consumption in the United States on average may contribute in the range of about 3 to 18 micrograms per day and a heavy seafood diet may raise blood mercury levels to on average up to 5 micrograms/L or more in some cases (NYC HANES 2007 study http://www.nyc.gov/html/doh/html/pr2007/pr059-07.shtml).[2]

Others have found that seafood consumption resulted in blood levels as high at 10 to 19.9 micrograms/L in 7 of 22 pregnant woman subjects although most 13 of 22 were under 5 micrograms/L (Hightower 2003).[3] Health data from studies suggest that 300,000–600,000 U.S. children are born each year with blood methylmercury levels exceeding the U.S. Environmental Protection Agency's (EPA) reference dose (Selin 2010).[4] Moreover, heavy fish diets could account for upwards of 200 to 500 micrograms of mercury per kilogram of fish ingested (Sunderland 2007).[5] In contrast, typical vaccines contain a very small amount of mercury as thimerosal in the order of 12.5 to 25 micrograms per dose.[6]

In the 1950s, the Chisso Corporation in Japan had enjoyed a worldwide monopoly on manufacture of plastics, specifically dioctal phthalate, and this was a source of prosperity for the Japanese. Profitable, but at what cost? The effluent from the manufacturing process released highly toxic methyl mercury into Minamata Bay in Kumamato Prefecture. Researchers at Kumamato University concluded that the source of poisoning was contaminated fish and shellfish in the bay. The concentration of methyl mercury found in a marine indicator species of mussels near the effluent waste water ranged from 26 to 121 ng/g.[7] A total of 2,263 cases of poisoning manifesting as neurological disease were reported by 1999, and of these 1,368 have died.[8] This Minamata Disease syndrome consists of sensory disturbance in distal extremities, ataxia, bilateral concentric visual field constriction, impairment of gait and speech, tremors, hearing impairment, abnormal eye movements, and muscle weakness. (See Figure 1.)

Despite the tremendous neurological burden of this disease caused by methyl mercury, there has been no direct link between thimerosal, which contains ethyl mercury, and autism spectrum disorder.

What was concerning was that, even though there was no evidence of harm, the cumulative dose of ethyl mercury had increased markedly since the 1940s since the number of vaccines containing it – primarily DPT, Hib, and Hepatitis B – had increased in the previous half century. Indeed, the latter two vaccines had not even been developed until the 1980s.[9]

In order to satisfy the two-year reporting period of the FDA Modernization Act, on July 9, 1999, the US Public Health Service and the American Academy of Pediatrics issued a joint statement which said:

"On the one hand, there is the known serious risk of diseases and deaths caused by failure to immunize our infants against vaccine-preventable infectious diseases; on the other, there is the unknown and probably much smaller risk, if any, of neurodevelopmental

Figure 1
"Tomoko Uemura in Her Bath." A severe case of Minamata Disease.[11] Photo by W. Eugene Smith.

effects posed by exposure to thimerosal. The large risks of not vaccinating children far outweigh the unknown and probably much smaller risk, if any, of cumulative exposure to thimerosal-containing vaccines over the first six months of life.

"Nevertheless, because any potential risk is of concern, the Public Health Service (PHS), the American Academy of Pediatrics (AAP), and vaccine manufacturers agree that thimerosal-containing vaccines should be removed as soon as possible."[10]

While thimerosal has not been present in childhood vaccines since 2003 in the United States, rates of autism climb. Anti-vaccine forces, however, remain undeterred. Some are now blaming aluminum in vaccines.[11]

References

1. Carithers HA: Mercury poisoning from calomel producing subacute acrodynia and its treatment with dimercaprol; report of a case. Pediatrics 1949;4: 820-4.
2. NYC HANES (Health and Nutrition Examination Study): http://www.nyc.gov/html/doh/html/pr2007/pr059-07.shtml
3. Hightower JM, Moore D: Mercury levels in high-end consumers of fish. Environmental Health Perspectives 2003:111(4):604-608.
4. Selin NE, Sunderland EM, Knightes CD, Mason RP: Sources of mercury exposure for US seafood consumers: Implications for policy. Environmental Health Perspectives 2010:118:137-143.
5. Sunderland EM: Mercury exposure from domestic and imported estuarine and marine fish in the US seafood market. Environmental Health Perspectives 2007;115(2): 235-242.
6. Thimerosal in Vaccines (Mercury in Plasma-Derived Products). Center for Biologics Evaluation and Research, FDA. http://fda.gov/cber/vaccine/thimerosal.htm
7. Haraguchi K, Ando T, Sato M, et al: Detection of localized methyl mercury contamination by use of the mussel adductor muscle in Minamata Bay and Kagoshima Bay, Japan. Sci Total Environ 2000;261:75-89.
8. Eto, K: Minamata disease. Neuropathology 2000; 20. S14-S19.
9. Mnookin S. The Panic Virus: A True Story of Medicine, Science, and Fear. 429 pp, Simon & Schuster, January 2011.
10. Notice to Readers: Thimerosal in Vaccines: A Joint Statement of the American Academy of Pediatrics and the Public Health Service, Weekly, July 09, 1999/48(26);563-565
11. Life magazine, June 2, 1972, © the Heirs of W. Eugene Smith

Disclosures

None reported.

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