Is Mercury Toxicity an Epidemic?

Joseph Pizzorno, ND, Editor in Chief

I find fascinating the many areas in which conventional medicine and integrative/functional/natural medicine perspectives conflict. While some are converging, such as the need for much-higher levels of vitamin D than previously thought, and some seem engaged in productive dialog, such as the importance of decreasing elevated homocysteine levels, others seem ever further from resolution. A good example is the issue of mercury (Hg) toxicity.

Conventional thinking has dismissed mercury toxicity as a clinical concern except in cases of obvious poisoning. This dismissal is due to the poor correlation between measures of mercury body load and symptoms (more on body load and symptoms below). It is also the reason the dental community has so consistently denied that amalgam fillings are a health risk. (Although called “silver” fillings, they are actually about 55% mercury). However, the integrative medicine community has for decades contested that chronic low-level mercury exposure is the root cause of many diseases ranging from autism to autoimmune disorders. I remember vividly from the late 1990s a televised, vituperative debate between Hall Huggins, DDS, an early mercury human NOT blood pressure crusader; and myself, in this case the moderate one! For every documented case Dr Huggins presented in which patients with multiple amalgams and serious disease recovered after mercury removal, Dr Herbert would attack the example as anecdotal at best and charlatanism at worst. This debate piqued my interest, but I felt there was not enough hard data to form a strong opinion.

This has now all changed. I am involved in what I believe is the most-sophisticated wellness program ever offered in a corporate environment. As part of this program we are performing numerous “nontraditional” laboratory measurements, including blood mercury levels. As well as running tests on corporate employees, we are also running all the tests on the wellness team, including myself. We were somewhat surprised to find that 10% of the employees had elevated mercury levels. However, even more surprising to me was the discovery that my levels were elevated as well! My red blood cell Hg level was 59.3 nmol/L, more than twice the “safe” level of < 24.9 nmol/L. I live a very healthy lifestyle, have no amalgam fillings, consume only small, wild-caught fish, eat 75% of my food organically grown, etc, so this was unexpected. I then had the same test done on my wife with similar surprising results. This lead to the obvious questions: Are the tests valid? Is the mercury damaging our health? Where is the mercury coming from? How do we get rid of it? And thus began a fascinating journey.

As I have mentioned before, although I am a true believer in this medicine, I am also utterly evidence driven. I believe the only way to advance a body of knowledge is to use good research to separate the truth from the errors. Therefore, when addressing the issue of mercury, I dove deeply into PubMed. A November 2008 search of “mercury human NOT blood pressure” yielded more than 1000 articles—plenty to look at. Following is a synopsis of what I found.

Mercury Exposure

There are primarily 4 sources of human exposure to mercury: occupational, environmental, fish, and amalgams.

1. Occupational. This is well known and important for those working in specific industries. Recently, there has been some great research on dentists. One large study was published in 2004 on several hundred dentists and dental assistants in Washington State. Interestingly, almost all of them had 4 or more symptoms consistent with mercury toxicity (again, more on symptoms below) and most had many more. And they had all these symptoms even though their mercury levels were much lower than, for example, a person working in florescent light manufacturing. In fact, their mercury levels were in the range found in about 5% of the population.*

2. Environmental. When mentioning to a researcher friend my mystification over the source of my wife’s and my own mercury levels, he related the story of some grant work he had done with a University of Washington atmospheric sciences professor over the past decade. As part of their federally funded study, they would periodically take some very expensive equipment in an airplane and measure mercury levels in the air over Seattle and Puget Sound. What they found was “a river of mercury.” They postulated, based on the distribution patterns, that this local mercury was coming from coal-burning in China, but their grants weren’t enough to fly all the way to China, just part way.

After hearing this, a bit of digging on my part found a 1994 map produced by the US Environmental Protection Agency (EPA) showing the levels of air mercury across the United States. The bad news is that not only is the Seattle area high, but even higher levels are found in the Northeast—in areas around coal-burning plants. A problem with this map is that the data are at least 15 years old. China now burns more coal than any other country, and its level of consumption has increased dramatically the past 15 years. According to a 2006 issue of The New York Times, every 10 to 14 days another coal-burning plant starts up in China.3

*Various mercury tests use different measuring methodologies, so it makes it very hard to compare levels between tests; ie, my level of 59.3 nmol/L means one thing in the test we used, but it could mean something else in another test. I will briefly cover these testing methodologies in the next editorial, which will be a follow up to this one.
3. **Fish.** Mercury from fish turns out to be more complicated. Without question, body Hg is proportional to the amount of fish consumed (hundreds of studies show this). However, neurological symptoms do not typically correlate well with fish consumption because of the brain-benefit effects of omega-3 fatty acids. My interpretation is that only high-mercury fish such as tuna or low-omega-3 fish such as those that are farmed or come from tropical regions are problematic. In 2003, the World Health Organization decreased the level of mercury consumption considered safe from 3.6 to 1.5 μg/kg of body weight per day. The EPA has set its “safe” exposure level at 0.1 μg/kg of body weight per day. Also, until 2003, the US Food and Drug Administration used a higher measurement of 0.4 μg/kg. It has since adopted the EPA’s levels. I have reason to doubt these set amounts are actually safe, as explained below.

4. **Amalgams.** A large number of studies have now shown a clear, direct correlation between the number of amalgam surfaces and mercury in the blood, hair, and urine. Of more concern is cadaver research showing the same direct correlation in the brain—the more amalgams, the more mercury in most areas of the brain. However, the correlation between the number of amalgam surfaces and symptoms is not so clear. New research, discussed below, may finally explain this discrepancy.

Bottom line: There are many well-documented sources of mercury contamination. The next question: At what level of body burden does mercury become clinically significant?

**Mercury Toxicity Symptoms**

For long-term, chronic exposure at moderate to high levels, the evidence is very clear that mercury is a serious neurotoxin. A 2008 report provides us long-term data on the tragic experience of Japanese people living in Minimata—who for years ate fish contaminated with industrial mercury waste. The report clearly demonstrates the large number of symptoms produced by mercury damage to the neurological system; there were more than 50 symptoms tracked by the researchers.

The key questions, then, are (1) At what level of exposure does mercury become toxic?, and (2) What are the most sensitive symptoms? This is where it gets very tricky, as symptoms do not correlate well with mercury toxicity except at high levels. Several studies give us clues. Two fairly large studies on dentists and dental assistants, including the 1 mentioned above, are very helpful as they provide good documentation on symptoms at exposure levels previously thought safe. Looking at these and other studies, I compiled a list of what appear to be, in decreasing order of prevalence, the most common symptoms of mercury toxicity.

However, trying to determine a “safe” level of mercury exposure seems almost impossible. I suspect we will find the story the same as for lead, where the “safe” level keeps declining with new research.

Why the poor correlation between mercury levels and toxicity? Turns out to be the same old issue we’ve discussed so many times before of biochemical individuality. New research is now showing, for example, that brain-derived neurotrophic factor (BDNF) genotype, the APOe-4 allele status, and other factors may now tell us which of our patients are most susceptible to mercury toxicity. BDNF genotype is a very good predictor of mercury toxicity, explaining about 40% of the variability between symptoms and body mercury levels. And it is not surprising that, just as APOe-4 is a predictor of brain susceptibility to oxidative damage, so, too, is it a predictor of sensitivity to mercury toxicity.

Bottom line: I believe mercury toxicity is a real clinical problem.

Next issue I will cover how to measure mercury body load and ways to get it out of the body.

**Table 1. Symptoms of Mercury Toxicity**

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<thead>
<tr>
<th>Symptom</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Depression</td>
<td>73%</td>
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<tr>
<td>Memory loss</td>
<td>70%</td>
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<tr>
<td>Anxiety</td>
<td>69%</td>
</tr>
<tr>
<td>Unintentionally dropping things</td>
<td>60%</td>
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<tr>
<td>Headaches</td>
<td>56%</td>
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<tr>
<td>Moodiness</td>
<td>45%</td>
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<tr>
<td>Shakiness in hands</td>
<td>44%</td>
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<tr>
<td>Stomach problems</td>
<td>43%</td>
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<tr>
<td>Fatigue</td>
<td>39%</td>
</tr>
<tr>
<td>Confusion</td>
<td>35%</td>
</tr>
<tr>
<td>Change in sense of smell or taste</td>
<td>29%</td>
</tr>
<tr>
<td>Paresthesia</td>
<td>26%</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>25%</td>
</tr>
<tr>
<td>Coordination problems</td>
<td>20%</td>
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<tr>
<td>Muscle weakness</td>
<td>16%</td>
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**This Issue**

As usual, our first issue of the year contains an index of articles—listed by both author and topic—for all issues of the previous year. This is a useful tool for anyone doing research or needing a quick reference.

Hypertension and diabetes increase the risk for myocardial infarction. Ryan Bradley, ND, and Erica Oberg, ND, MPH, present many nonpharmaceutical treatments that may help to lower this risk, including exercise; yoga; frequent fruit/vegetable consumption; and dietary supplements such as beta-glucan, niacin, artichoke extract, L-carnitine, coenzyme Q10, and fish oil. They also cover red yeast rice studies, which have demonstrated concrete benefits equivalent to pharmaceutical statins. A recommendations page, designed as a patient handout for clinicians to copy and give to their patients, is included.

Earl A. Surwit, MD; Jill Campbell, RN, BSN; and Kathy Karaszewski, RN, MBA, provide us a very useful article on the treatment of urge incontinence with a combination of pelvic floor muscle rehabilitation and neuromodulation techniques. Their excellent results, long-term benefits, and lack of adverse events suggest that this is an important tool for practitioners with gynecological practices.
In this second part of an article began 2 issues ago (sometimes we just don’t have enough pages for all the great articles we receive), Rick Liva, ND, RPh, provides clinicians continuing guidance on quality assurance issues—this time mainly focused on solvents, including what to ask manufacturers and how to interpret their answers.

In 1979, Julian Whitaker, MD, launched the Whitaker Wellness Institute Medical Clinic to share his knowledge with patients who had been failed by conventional medicine and had nowhere else to turn. Since its inception, more than 25 000 patients have participated in Dr Whitaker’s intensive program of diet, exercise, nutritional and herbal supplementation, and lifestyle changes. I think all will enjoy our interview of this pioneer.

In News and Analysis, John Weeks, as usual, provides us key insights on the politics and economics of healthcare. I think especially interesting the huge interest and curiosity around President Obama and the healthcare crisis.

As usual, Bill Benda, MD, identifies a critical current issue in his BackTalk column: What do we want to say to President Obama and how do we get heard? This is, indeed, a challenge, as solving the healthcare crisis will truly require out-of-box thinking.

Unfortunately, our political process today seems most responsive to the vested interests. Strong leadership and courageous insight will be needed. I find it promising that elected officials with a strong interest in integrative medicine are found on both sides of the political aisle. We seem to have as many Democratic as Republican friends. The problem is that there are not enough of them. I fully concur with Bill; our real access is likely grassroots—with each of us educating our local congress men and women about the real changes that are needed to solve the healthcare crisis.

References


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