Heavy Metal Toxicity and ADHD

Deb Gilbertson and Pip Martin

Attention-Deficit/Hyperactivity Disorder (ADHD) affects 3-5% of the population and is characterized by persistent problems with inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2000). The New Zealand Ministry of Health (2001) quotes a 1987 figure from the Dunedin Health and Development Study (Anderson et al., 1987) of 6.7% prevalence of children in Dunedin.

Cumulative evidence shows that the long-term prognosis for ADHD is poor, with higher rates of persistent psychiatric problems (Shekim et al., 1990), neurocognitive difficulties (Murphy et al., 2002), and academic struggles (Ratey et al., 1992). Many theoretical models have been put forward to explain the cause of ADHD (Barkley, 1997); however, it is largely recognized that it is a heterogeneous disorder with multiple causal factors.

About 50% of prison inmates meet the ADHD criteria (e.g., Rasmussen et. al., 2001; Rosler et al., 2004; Andrade, 2004; Walsh, 1996). Denno (1990) showed from her 22 year study of 1000 children that the best predictor of aggressive behaviour in school, juvenile delinquency, and eventual criminal violence was the degree of lead poisoning. Violence is a characteristic of conduct disorder and lead poisoning, but is not a characteristic of ADHD.

However there is a strong co-morbid relationship between ADHD and conduct disorder with Green (1999) calculating that a third of ADHD clinical patients also have conduct disorder. Hinshaw's (1987) comprehensive review of ADHD and Conduct Disorder showed that children classified as hyperactive and aggressive overlap considerably. That is, 30%-90% of children in one group could also be classified in the other group using either cutoff scores or cluster analytic methods.

Ward’s study (2002) showed that on average the 1238 ADHD children compared to the 436 control children in his study had 2.5 times for level of lead, 3.8 times the level of aluminium, and six times the level of cadmium. In a separate study by Ward (1996) of 28 violent criminals, the pattern of heavy metal toxicity and mineral deficiencies were the same as for the ADHD group, but at a more extreme level.

The World Health Organization (WHO) has acknowledged environmental pollution as the underlying cause of 80% of all chronic degenerative diseases (Prüss-Üstün & Corvalán, 2006).

Considerable research links ADHD with high heavy metal levels, especially lead, aluminium, cadmium, mercury, manganese and copper (Ward, 2002; Eppright et al., 1996; Bellinger, 1994; David, 1974; Bock, 2007; Froehlich et al., 2006; Minder et al., 1994; Barlow 1983, Braun et al., 2006; Swartz et al., 2000; Tuthill, 1996; Needleman et al., 1979, 1982, 1990, 1993, 1996; Kostas, 1996; Stratesky, 2006; Wasserman, 2003; Mendelsohn, 1998). A UK study (Lewendon, 2001) found ADHD students were 17 times more likely to have high lead levels than controls. But not all research shows a link (e.g., Kahn, Kelly, & Walker, 1995).

However, most of these studies used traditional urine, faeces, hair and blood tests. These are useful for showing recent exposure to environmental toxins but are less effective at showing if a body is failing to eliminate heavy metals. By contrast, the porphyrin urine tests measures evidence of heavy metal levels stored in the body, however this test has only recently become available in New Zealand.

We have been testing children with ADHD for heavy metals using hair tests. The results have been startling. These children are obtaining very high scores (between the 95th and 99.9th percentiles; e.g. the 99.9th percentile result was for 23mg/g with a reference range
of less than 1.5mg/g) using Tissue Hair Mineral Analysis (THMA) for total heavy metal toxicity especially lead. For information on these tests see Watts (1995).

We have also been using the Ionic Heavy Metal Urine Test (IHMUT) since it became available in New Zealand in March 2006. This is a low cost and easy to administer test that has been useful for deciding if a more expensive test for heavy metals is required.

Unlike other systems developed for the detection of heavy metals (atomic absorption spectro photometry, electron stripping etc.) which detect total levels of heavy metals, the IHMUT detects only ionic and free radical producing metals. Electrically active heavy metal atoms that are not bound with organic complexes destroy molecular compounds causing the formation of free radicals. A healthy body can chelate free heavy metal atoms, i.e. neutralize their electromagnetic charge and clear them out. However, at higher levels of toxicity the number of free radicals will increase. The test detects heavy metals damaging the body, not metals being successfully bound and chelated from the body. We are finding that the test correlates well with other tests of heavy metal toxicity, but there is inadequate independent scientific research to confirm its effectiveness.

We have just started using porphyrin urine tests which only became commercially available in New Zealand in July 2007. However since this test is more expensive than other tests we are using IHMUT to get preliminary results.

The porphyrin shows the effect on the heme (hemoglobin) pathway of heavy metals in the tissues, so it is not necessary for the body to be eliminating the heavy metals to identify a heavy metal issue. When heme synthesis is disturbed, some porphyrin precursors to heme will build up inside the red blood cells, while other porphyrins are excreted in the urine and can be used as markers of genetic diseases or toxic exposures. The excess porphyrins in urine result from genetic deficiencies in several enzymes in the heme synthesis pathway(s), but can also be produced by inhibition of these same enzymes by toxins.

New research findings, such as by Kelsey (2005), are showing that some individuals have a gene that prevents the elimination of heavy metals.

About 80% of ADHD can be explained by genetic endowment (Sherman et al., 1997; Judziak et al., 2005; Kuntsi et al., 2005). However, studies linking ADHD with heavy metals indicate over 50% of hyperactive children have high levels of lead (e.g., Bock, 2007, David, 1974). The implication is that ADHD genes inhibit the elimination of heavy metals, or store them in the brain, or trigger expression of ADHD behaviours.

A few studies have looked at the impact of chelation on ADHD. However, these have significant issues such as needing to be administered every four hours, failure to chelate heavy metal from the brain, strip zinc and iron from the body causing brain damage, or lack the support systems to ensure that heavy metals that are chelated out of the cells are safely transported out of the body (Smith, 1998; Strupp, 2006).

Georgiou (2005) developed Heavy Metal Detox (HMD) from a large scale, three year Russian study. This natural product compound targets heavy metals rather than chelating all metals, and safely binds the heavy metals for elimination from the body. HMD is as effective as traditional systems, safer, and chelates from all parts of the body including the brain. HMD is available without prescription in many countries in the world including New Zealand.

We are offering a heavy metal detoxification programme to safely chelate heavy metals to patients with high toxicity levels. The process usually spans four months. The literature shows many practitioners are finding chelation to be very effective for reducing negative ADHD and conduct disorder behaviour. However we are not aware of any well constructed, double blind, placebo controlled chelation studies for people with ADHD, so no claims of effectiveness can be made.
There is relatively little research on ADHD and heavy metal toxicity but there is considerable research in other neurological conditions, most notably autism (e.g., Nataf et al., 2006; Geier & Geier, 2006).

References


Achenbach, T. (2001b). *Teacher's Report Form for Ages 6-18* (Achenbach System of Empirically Based Assessment (ASEBA)).


Hartmann T. (1999) *Attention Deficit Disorder – A Different Perception* Newleaf, Dublin, 189pp


