ACUPUNCTURE Today

HEALTH & WELLNESS / LIFESTYLE

Hazards in the Environment Making Your Patients Sick

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Working both separately and together, Western and Chinese medicine have many successes in the treatment of the myriad diseases that afflict human beings in modern times. However, in spite of our best efforts at diagnosis and treatment, many chronic illnesses have been increasing in frequency. There has been a steady increase in the incidence of certain hormonal disorders, certain forms of cancer, neurological disorders, and autoimmune disorders. In terms of specific diseases we have noted an increase in hypothyroidism, Alzheimer's disease, Autism, ADHD and autoimmune disorders such as rheumatoid arthritis (especially in women) and Sjogren's disease.

Medical researchers and epidemiologists do not fully understand all the causes for this alarming increase, but I believe one of the most important is toxins in the environment. I would like to discuss this serious problem because it affects every one of your patients. It's difficult to avoid all these toxins as they are so ubiquitous, but the more we all know about them the better job we can all do in helping our patients keep their exposure to a minimum. Here is a rundown of the most prevalent ones and the health problems they create.

TOXIN: Bisphenol A (BPA)

Bisphenol A is found in polycarbonate plastic bottles, plastic food containers, dental materials, and the linings of metal food cans. BPA has hormone-like properties because its chemical formula is similar to steroid hormones. Compounds such as this are known as endocrine disruptors. BPA is a known endocrine disruptor and numerous studies have found that laboratory animals exposed to even low levels of BPA have elevated rates of diabetes, breast cancer and prostate cancer. They also have decreased sperm counts, reproductive problems, early puberty, obesity, and neurological problems.

A 2010 report from the FDA identified BPA's as possible hazards to fetuses, infants, and young children. Since that time numerous studies have been performed at the National Center for Toxicological Research. The FDA has now ended its authorization of the use of BPA in baby bottles, sippy cups and infant formula packaging, but prior to this time infants were widely exposed to this harmful substance. Fortunately most water bottles produced now are made of high-density polyethylene, which is much safer. I believe, however, that we carry the cumulative effects of prior exposure to BPA even if we are less exposed to it today.

Until a few years ago, hypothyroidism was mostly a disorder of women, mostly in their forties or fifties, mostly due to an uncommon autoimmune disorder, Hashimoto's disease. Men rarely developed hypothyroidism. Low function of the thyroid gland is now as common in men as in women, and is often affecting patients in their twenties and thirties, as well as those who are older. All adults and teenagers are at risk. The increased incidence in men as well as in women is closely related to toxic environmental triggers such as Bisphenol A (BPA). It blocks the action of thyroid hormone at the cell-receptor sites around the body, and may also be toxic to the thyroid gland

itself. Other environmental toxins, notably phthalates and parabens may also provoke hypothyroidism, as discussed below.

TOXIN: Phthalates

Phthalates are used to soften hard plastics to make them more like rubber. They are very widespread in our modern environment, found in shower curtains, vinyl flooring materials, electric cords and medical equipment where soft or malleable plastics are desired. They are found in the mother boards of computers and other electronic equipment. They are also used in air fresheners and scented candles as a dispersant of the fragrance. Such chemicals can be spread by touch or by breathing them in, or by consuming them in food. Phthalates are so widespread in modern life that in one study 99 percent of all adults tested had phthalates or their metabolites noted in their urine. At least the body tries to get rid of them!

One phthalate, diethylhexylphthalate (DEHP) is used in the manufacture of medical tubing, catheters and blood bags. It may harm sexual development in male babies. In 2002, the Food and Drug Administration released a public report, which cautioned against exposing male babies to DEHP. The reported stated that exposure to DEHP has produced a range of adverse effects in laboratory animals, especially the male reproductive system and production of normal sperm in young animals. "In view of the available animal data, precautions should be taken to limit the exposure of the developing male infant to DEHP." Other studies since then have indicated phthalates may play a causal role in disrupting neurological development in male infants exposed to it as well as older children. Alzheimer's disease, Autism and ADHD may be linked to exposure to phthalates, as well as parabens, BPA and polybrominated biphenyl esters, discussed below.

Exposure to BPA and Phthalates

A large human study recently linked phthalates, BPA and low thyroid hormone levels. The study was carried out at the University of Michigan and was reported in July, 2011. In this study of 1,700 adults and adolescents, researchers found a clear link between low thyroid function and the presence of Bisphenol A and phthalates in the urine. Even more intriguing was the fact that they noted an inverse relationship between urinary markers of exposure to these toxins and the level of thyroid hormones in the bloodstream. Thus, as urinary metabolite concentrations of these toxins increased, serum levels of thyroid hormone decreased accordingly. The metabolite that was most notably associated with reduced thyroid function was DHEP, described above.[1]

Parabens

American women have the highest rate of breast cancer in the world. Why? American women tend to be overweight or frankly obese (more than two out of three). Lack of exercise is very common. Consumption of a high fat diet with lots of processed starchy food is widespread. However, exposure to xenoestrogens is what pushes them over the top: polyvinols, phenols and bisphenols (plastic bottles, lining of cans), phthalates (plastic softeners and fragrance dispersants), bromides and chlorides (fire retardants) and parabens (cosmetics, deodorants, creams). "Xeno" means foreign. A xenoestrogen is a chemical substance that acts like estrogen in the body, often in toxic ways. In this case, xenoestrogens stimulate the development of breast cancer, just like the body's regular estrogens do.

Parabens are chemicals that serve as preservatives in antiperspirants and many cosmetics, as well as sun lotions. Previous studies have shown that all parabens have estrogenic activity in human breast cancer cells. New research examining parabens found in cancerous human breast tissue points the finger at antiperspirants and other cosmetics for increasing the risk of breast cancer.

This research, which is reviewed in an editorial published in the *Journal of Applied Toxicology*, looked at where breast tumors were appearing, and determined that higher concentrations of parabens were found in tumors located in the upper quadrants of the breast and axillary area, where antiperspirants are usually applied!

From the *Journal of Applied Toxicology*: "The data from this latest study, the most extensive examination of parabens in human breast so far published, confirms previous work and raises a number of questions on the entire parabens, personal care products and human health debate, particularly relating to the source and toxicological significance of the paraben esters."

Paraben esters were found in 99 percent of the 160 tissue samples collected from mastectomies. The only possible source is the environment: antiperspirants, cosmetics, skin creams. Another component of antiperspirants, aluminum chloride, has been found to act similarly to the way oncogenes work to provide molecular transformations in cancer cells (laboratory animal research). According to the authors of the editorial review of the *Journal of Toxicology*, the research provides "signals of concern that such compounds are not as safe as previously considered, and further research is warranted."[2]

Women should avoid xenoestrogens as much as possible:

- 4MBC in sunscreens (4 methylbenzine camphor)
- Insecticides, weed killers (many chemicals)
- Polychlorinated biphenyls (PCB's) in adhesives, lubricants, paints
- Nonylphenol in PVC products and spermicides
- Phthalates in plastic products (widespread)
- Parabens in skin lotions, deodorants, and shampoos
- Red dyes in foods and body paints
- Bisphenol A in plastic bottles and tin cans

Halogenated Fire Retardants

Fire-retardants are used in the foam found in products like cribs, high chairs, and strollers. The chemicals involved are PBBEs (polybrominated biphenyl esters) or other retardants made with bromine or chlorine, linked to sexual and neurological disorders, and increased incidence of cancer. These potential toxins are also added to the plastic cases of computers and television sets. PBBE's are structurally very similar to Polychlorinated biphenyls (PCBs), and have similar neurotoxic and carcinogenic effects. Extremely toxic, PCB's were widely used in industry in former years, but all PCB production was banned by the United States Congress in 1979 and by the Stockholm Convention on Persistent Organic Pollutants in 2001. If the polybrominated and polychlorinated fire retardants currently in wide distribution are similar in their effects to PCB's then they are of great concern.

PBBEs have the potential to disrupt thyroid hormone balance and contribute to a variety of neurological and developmental deficits, including low intelligence and learning disabilities. Many of the most common PBBE's were banned in Europe in 2006. Many countries in Europe have been more pro-active in terms of banning environmental toxins than we have here in the United States.

Final Thoughts

I cannot cover in an article all the toxic substances that we are often exposed to that can impact our health. We are all aware of the dangers of automobile, diesel engine, and two-stroke engine exhaust, as well as coal-fired power plant emissions. We know of the potential contamination of our groundwater, particularly the hazards of underground gasoline tanks, let alone the common

presence of traces of arsenic in our city water supplies (which may lower our IQ!).

It feels as though we cannot escape. However, as they say, knowledge is power. More knowledge and everyday awareness of these hazards will definitely help us to lower our exposure and lower the risks to our health. As concerned citizens and as a practitioner you should be pro-active in encouraging government and industry to limit our exposure to toxins and make your patients aware of their danger.

References

1. http://ns.umich.edu/new/releases/8473
2. Journal of Applied Toxicology 2003: 23(2): p 89-95

AUGUST 2014