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Concerns Over Bisphenol A (BPA) Exposure

CONCERNS OVER HUMAN EXPOSURE TO BISPHENOL A

Found in everything from baby bottles to contact lenses, tooth fillings to soda-can linings, Bisphenol A or BPA is a chemical component of plastics used to make them more resilient. But what is our current state of understanding regarding the true risk to humans? Should we be advising patients to avoid exposures to BPA found in countless food and beverage containers? The chemical is a recognized hormone disruptor. Recent studies have raised concerns about a potential link between BPA and cancers, as well as obesity. Some states have even moved to ban the chemical in children's products. You're listening to ReachMD, the Channel for Medical Professionals. Welcome to the Clinicians Roundtable. I am your host, Dr. Jim Keany, Emergency Physician at the Mission Hospital Regional Medical Center. Our guest is Dr. Retha Newbold, Developmental Reproductive Biologist for the National Institute of Environmental Health Services. For over 30 years she studied the effects of various endocrine-disrupting chemicals and she maintains an active research program focussed on the role of estrogen in abnormal and normal development.

DR. JIM KEANY:

Welcome, Dr. Newbold.

DR. RETHA NEWBOLD:

Good morning.

DR. JIM KEANY:

So I see that you are looking at my ever present bottle of bottled water and think, ha, is this the behavior that I need to change and before we get to that I need to back up with you a little bit and ask how are humans exposed to BPA?

DR. RETHA NEWBOLD:

Well, the primary source for exposure is through the diet. But we can also be exposed in the air we breathe, through the dust just even household dust and in the water. As you just mentioned, there are a number of products that do have BPA, polycarbonate plastics that

we use in food and drink packaging, water, and infant baby bottles, these plastic bottles, compact discs, eyeglasses and a number of impact-resistant safety equipment and even some medical devices.

DR. JIM KEANY:

As I am reading a statement from a group from NIEHS and it's saying that we are confident that adult exposure to BPA affects the male reproductive tract and that long lasting organizational effects in response to developmental exposure to BPA occur in the brain, the male reproductive system and the metabolic processes. And then regarding females it says that we consider it likely but require further confirmation. Can you tell me what biological effects you think are likely in humans related to BPA?

DR. RETHA NEWBOLD:

The statements that you just mentioned were really referring to data that has been accumulated from experimental animal studies. Now, if we take that data and we look at biological effects in humans some of the things that physicians might see and again I have to, you know, point out that we don't have any specific data that we can call on for humans. But some of the things they might look for is perhaps abnormal sexual development that would be maybe abnormal development in the male as far as the penis is concerned and I am talking about, you know, sexual organs. You may see early sexual maturation or early puberty in females. There may be some tendency for seeing behavioral changes, hyperactive disorders like ADHD or autism. You may see some changes as far as obesity. I mean we know that these things are happening anyway, but these are things that might happen as far as children are concerned and for adults there may be some changes as far as problems with fertility. And there are may be some associations with prostate and breast cancer. But again, these are things that have been theorized for the human population and these are worries that many of the scientists that are finding these things in experimental animal systems, they are suggesting that we look for this and look for correlation in the human population. But again, we don't have that information.

DR. JIM KEANY:

So we are extrapolating this data from animal studies, but what I am wondering is what change because it seems that a lot of these animal studies have been there for quite a while and yet within the last year it appears that the stance on those studies has changed. My understanding was that they were ignoring, or not ignoring, but discounting the studies related to parenteral exposure and giving more weight to the exposure that was ingestions and now we have changed that stance, is that correct?

DR. RETHA NEWBOLD:

There is a lot that has been going on and it is like a moving target almost because we are finding out more information, more scientific and mechanistic information almost everyday on this particular chemical and other endocrine-disrupting chemicals. At one time, we thought there was a particular safe level that everybody was exposed to that was acceptable and now we are finding out from animal data that even very low levels of exposure can have effects. So that is a part of the concern because we know from studies from the CDC, that is, the Center for Disease Control and Prevention. They have gone in and they have measured amounts of Bisphenol and some other chemicals in urine samples from a large population of people in United States and 93% of that population has levels of BPA in it. And people sort of look at the CDC this information is being representative of what the exposures are in the United States. So, we know that there is human exposure what we don't know if this is related to harmful effects. But experimental animal data suggests that abnormal or adverse effects can happen at these levels.

DR. JIM KEANY:

Recently when the National Toxicology Program that had a press release that really brought this to the forefront of the media's attention. In that instance, did something changed at that time or is this again as you are stating a kind of a buildup of information that is coming to our head at this point?

DR. RETHA NEWBOLD:

Well, I guess it was a few months ago, the National Toxicology Program actually reviewed the literature and put together a lot of the experimental animal data, and they did issue a report and in that report they said that there was some concern for the effects on brain, behavior, and also prostate, and mammary glands. So that is the effects of Bisphenol A on these particular systems. That report again sort of consolidated a lot of the information that were just now reaching some concern. Now they rank that as some concern. Now that's based on like a 5-level tier of concern. So that is about a midway.

If you have just joined us you are listening to the Clinicians Roundtable on ReachMD. I am your host, Dr. Jim Keany and our guest is Dr. Retha Newbold, a developmental reproductive biologist for the National Institute of Environmental Health Services.

DR. JIM KEANY:

Dr. Newbold, are certain populations at a greater risk to exposure, for example pediatric patients, pregnant patients, patients with certain medical conditions such as diabetes or cancer?

DR. RETHA NEWBOLD:

Now all of my work has been with exposures that have happened during development. So that specifically is my worry. So that would be your pediatric patients and perhaps the pregnant woman too. What we know with developmental exposures and even early childhood exposures, is that there is a lot of developing systems that are still going on. It's going on in experimenting animals, but it is also going on in humans and what happens is if you get exposure to any of these endocrine-disrupting chemicals, BPA for example, that it can cause long-lasting effects. The exposure may be there and it is happening just during this time of development and then the exposure may go away. But what happens is that these systems, these developing systems, are programmed and you may have an irreversible change and you may not even notice it, you may not even see it but it will cause a change so that later on in life perhaps these individuals will be more susceptible to disease. We have examples in the animal models that there is a relationship between exposure to prenatal BPA and the development of childhood and adult obesity. I think the major concern with BPA so far has been with reproductive changes and behavioral changes. But there is good experimental animal evidence to suggest that obesity and the development of type 2 diabetes may also be related to this developmental exposure. Now, that really doesn't speak to exposure of adults. Now, if you are talking about adult exposure, often times which you see there is this chronic exposure that lasts throughout lifetime, and we do know that we have human exposure that is chronic. So we really don't know what the effects are of this long-term chronic exposure. Most likely it would be different than the developmental exposures but again my concern has been mainly with developmental exposures.

DR. JIM KEANY:

So it sounds like we do have reason for concern at this point, but we don't really have good solid firm answers that we can hang our hat on.

DR. RETHA NEWBOLD:

That's correct.

DR. JIM KEANY:

What I am wondering then is, is there a recommendation at this point that doctors should be advising their patients, you know, avoid this when you are pregnant, avoid using plastic bottles for your children, or any specific recommendations like that, or do we just not know?

DR. RETHA NEWBOLD:

I think it is a matter of I am really concerned about not causing like increased panic especially with young parents, but there are just precautionary things that we can suggest. And again as you say, avoid using plastic containers whenever possible. Of course I don't think if someone uses a plastic container for one particular time that it is going to be, you know, that serious of an event, but we are talking about continuous use. We are talking about the amount of body burden that is actually accumulating from exposures to BPA; so just a precautionary measure. Don't heat foods in plastic ware. Use glass or stainless steel or porcelain, you know, whenever possible but definitely don't microwave. And don't clean your plastic ware with harsh detergents because that causes more BPA to leach out. And don't cover foods with plastic wrap when you are heating.

DR. JIM KEANY:

Even if it doesn't touch the food?

DR. RETHA NEWBOLD:

Throw a piece of paper over the top of your food. These are just being precautionary measures.

DR. JIM KEANY:

Now, I appreciate most of those but the one that really gets me is the low-level exposure. I, for example, at work in the emergency department will drink two bottles of bottled water every single day. And you look at people who drink sodas that are lined with cans that are lined with plastic and they will drink one or two or more sodas everyday, and you start adding these up and you realize that all of us to a very large extent are exposed to it on a regular basis.

DR. RETHA NEWBOLD:

That's right.

DR. JIM KEANY:

And so that makes me really wonder if that's a habit that we should change. You know, even drinking one or two sodas a day everyday, is that a habit that should be changed?

DR. RETHA NEWBOLD:

It seems like to me we should go back to you know using glass or using stainless steel. I mean not only we have to worry about exposing ourselves to BPA but we are also contributing to the landfill problem.

DR. JIM KEANY:

Exactly.

DR. RETHA NEWBOLD:

Again, these are things that I think that just taking these into consideration and a one time exposure, I don't know if that's going to be an issue. But we are exposed to so many different endocrine-disrupting substances, and we are exposed to a number of things that have BPA that we don't even know where they are. So why not decrease those things that we do have some knowledge about. Why not decrease it where we can?

DR. JIM KEANY:

I want to thank our guest, Dr. Retha Newbold. We have been discussing the recent concerns over human exposure to Bisphenol A.

I am Dr. Jim Keany. You have been listening to Clinicians Roundtable on ReachMD, the Channel for Medical Professionals. Be sure to visit our website at ReachMD.com featuring on-demand pod casts of our entire library and thank you for listening.

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