Human Placenta and Markers of Heavy Metals Exposure

Human Placenta and Markers of Heavy Metals Exposure

http://dx.doi.org/10.1289/ehp.1206061

In their review, Esteban-Vasallo et al. (2012) discussed the use of human placenta to evaluate biomarkers of exposure to heavy metals. They correctly concluded that the use of placental tissue specimens to assess heavy metal exposure is actually underused. Surprisingly, they did not mention the well-documented relationship between mercury released from mercury-containing dental amalgam fillings and mercury disposition in placental tissues (Clarkson and Magos 2006; Gundacker and Hengstschläger 2012; Richardson et al. 2011).

Studies have suggested an association between mercury levels in placental tissues and the observed mercury dental amalgams in women (Ask et al. 2002; Palkovicova et al. 2008; Richardson et al. 2011). Elevated placental mercury levels have been reported in dental workers who, throughout pregnancy, were exposed to mercury vapor (HgO) released during preparation of mercury amalgam in dental offices (Guzzi and Pigatto 2007; Wannag and Skjaeråsen 1975). As noted by Drasch et al. (1994), the mother-to-fetus transfer of mercury Hg0 from amalgams has been reported in human autopsy samples, and elevated levels of total mercury have been observed in the brain, liver, and kidney of human fetuses; these levels have been linked to the number of maternal amalgam-restored surfaces.

Transplacental exposure to heavy metals may affect child growth and cause neurodevelopmental delays. Thus, further efforts should be made to measure and quantify maternal exposure to heavy metals in placenta to estimate environmental prenatal exposure.

The authors declare they have no actual or potential competing financial interests.

Perspectives

Gianpaolo Guzzi
Italian Association for Metals and Biocompatibility Research (AIRMEB)
Milan, Italy
E-mail: gianpaolo_guzzi@fastwebnet.it

REFERENCES

Ask K, Åkesson A, Berglund M, Vahter M. 2002. Inorganic mercury and methylmercury in placentas of Swedish women. Environ Health Perspect 110:523–526.
Clarkson TW, Magos L. 2006. The toxicology of mercury and its chemical compounds. Crit Rev Toxicol 36(8):609–682.
Drasch G, Schupp I, Höfl H, Reinke R, Roeder G. 1994. Mercury burden of human fetal and infant tissues. Eur J Pediatr 153:607–610.
Esteban-Vasallo MD, Aragonés N, Pollan M, López-Abente G, Perez-Gomez B. 2012. Mercury, cadmium and lead levels in human placenta: a systematic review. Environ Health Perspect 120:1369–1377.
Gundacker C, Hengstschläger M. 2012. The role of the placenta in fetal exposure to heavy metals. Wien Med Wochenschr 162:201–206.
Guzzi G, Pigatto PD. 2007. Occupational exposure to mercury from amalgams during pregnancy. Occup Environ Med 64:715–716.
Palkovicova L, Ursinovna M, Masanova V, Yu Z, Hertz-Picciotto I. 2008. Maternal amalgam dental fillings as the source of mercury exposure in developing fetus and newborn. J Expo Sci Environ Epidemiol 18:326–331.
Richardson GM, Wilson R, Allard D, Purtillo C, Duoma S, Gravide J. 2011. Mercury exposure and risks from dental amalgam in the US population, post-2000. Sci Total Environ 409:4257–4268.
Wannag A, Skjaeråsen J. 1975. Mercury accumulation in placenta and foetal membranes. A study of dental workers and their babies. Environ Physiol Biochem 5:346–352.

Human Placenta and Markers of Heavy Metals Exposure: Esteban-Vasallo et al. Respond

http://dx.doi.org/10.1289/ehp.1206061R

We appreciate the interest of Pigatto et al. in our review (Esteban-Vasallo et al. 2012). We understand their concern regarding mercury amalgams; however, the purpose of our review was to summarize the available information on total mercury, cadmium, and lead levels in human placental tissue, obtained from studies that reported original quantitative data. Published evidence suggests a possible association between mercury released from mercury-containing dental amalgam fillings and levels of this metal in diverse fetal tissues (kidney, brain, and cord blood) (Drasch et al. 1994). In contrast, studies focusing on human placenta and amalgams are scarce and their results inconsistent. The only two studies included in our review that assessed a possible relationship between dental fillings and total mercury—a small study in Taiwan (46 women) (Hsu et al. 2007) and another in Jamaica (52 women) (Grant et al. 2010)—found no association. Only Ask et al. (2002) reported higher mercury levels in mothers with a higher number of fillings, but they studied inorganic mercury and not total mercury.

None of the studies mentioned by Pigatto et al. in their letter (Clarkson and Magos 2006; Gundacker and Hengstschläger 2012; Richardson et al. 2011) includes original data, although we did identify an additional reference from those articles that might provide more data on this issue, a symposium abstract by Ursinovna et al. (2006). In this abstract, the authors described a significant correlation between the number of amalgams and placental mercury levels in 409 women; however, these findings have not yet been published in a full report that would allow us to better evaluate the results. In addition, Wannag and Skjaeråsen (1975) seemed to provide original information, but we were unable to find this paper for our review. In this context, we have to disagree with Pigatto et al.; in our opinion, the association between mercury exposure from dental amalgam fillings and levels of this metal in human placenta cannot yet be considered as well-established.

The authors declare they have no actual or potential competing financial interests.

Maria D. Esteban-Vasallo
Subdirectorate for Health Promotion and Prevention
Madrid Regional Health Authority
Madrid, Spain

Nuria Aragonés
Marina Pollan
Gonzalo López-Abente
Beatriz Perez-Gomez
National Center for Epidemiology/ CIBERESP
Carlos III Institute of Health
Madrid, Spain
E-mail: bperez@isciii.es

REFERENCES

Ask K, Åkesson A, Berglund M, Vahter M. 2002. Inorganic mercury and methylmercury in placentas of Swedish women. Environ Health Perspect 110:523–526.
Clarkson TW, Magos L. 2006. The toxicology of mercury and its chemical compounds. Crit Rev Toxicol 36(8):609–682.
Drasch G, Schupp I, Höfl H, Reinke R, Roeder G. 1994. Mercury burden of human fetal and infant tissues. Eur J Pediatr 153:607–610.
Esteban-Vasallo MD, Aragonés N, Pollan M, López-Abente G, Perez-Gomez B. 2012. Mercury, cadmium and lead levels in human placenta: a systematic review. Environ Health Perspect 120:1369–1377.
Grant C, Laior G, Fletcher H, Potter T, Vutchkov M, Reid M. 2010. Elements in human placentalae in Jamaica. West Indian Med J 59:479–485.
Gundacker C, Hengstschläger M. 2012. The role of the placenta in fetal exposure to heavy metals. Wien Med Wochenschr 162:201–206.
Hsu CS, Liu PL, Chien LC, Chou SY, Han BC. 2007. Mercury concentration and fish consumption in Taiwanese pregnant women. BJOG 114:81–85.
Richardson GM, Wilson R, Allard D, Purtillo C, Duoma S, Graviere J. 2011. Mercury exposure and risks from dental amalgam in the US population, post-2000. Sci Total Environ 409:4257–4268.