Elevated levels of cobalt and chromium found in offspring of moms with metal-on-metal hip implants

CHICAGO - Women with metal-on-metal hip implants, where both the ball of the joint and the surface of the socket are made of metal, pass metal ions to their offspring during pregnancy, according to a study by researchers at Rush University Medical Center. The ions are the result of wear and corrosion as the metal parts rub against one another.

The data showed a correlation between levels of cobalt and chromium - components of metal implants - in mothers and their babies at the time of delivery.

The study will be presented March 9 at the 2010 Annual Meeting of the American Academy of Orthopaedic Surgeons in New Orleans.

"We don't know whether metal ions pose any health risks for pregnant women and their babies," said Dr. Joshua Jacobs, professor and chairman of orthopedic surgery at Rush, "but as metal-on-metal implants increase in popularity and use, especially among young, active patients, women of child-bearing age and their doctors need to be aware of these findings when considering options for hip replacements."

Jacobs and his colleagues evaluated three women who had metal-on-metal hip implants and gave birth two to six years after their surgeries.

Maternal and umbilical cord blood was obtained at the time of delivery and tested for blood serum concentrations of titanium, nickel, cobalt and chromium using inductively coupled plasma mass spectrometry, a highly sensitive technique that can detect trace amounts of metals in biological samples.

The researchers found that mothers with metal-on-metal implants and their offspring had significantly higher levels of chromium and cobalt compared with a control group of seven women and their offspring who were also tested at the time of delivery. Moreover, the levels of these metals in the blood of mothers with implants correlated with the levels found in the umbilical cords. Cobalt levels in newborns were about half that in the mothers' blood, while chromium levels were about 15 percent of the mothers' chromium levels. In the control group, no correlation existed.

The lower levels in the umbilical cords indicated that the placenta provided at least some barrier to the transfer of metal ions from mother to fetus, but not a complete barrier, Jacobs said.

Levels of titanium or nickel showed no significant difference between the two groups.

It is unknown whether metal ions in the bloodstream - for pregnant mothers, developing fetuses or newborns - pose any significant health risk. According to Jacobs, medical device companies are working to improve the wear and corrosion properties of metal implants to reduce the release of metal ions.

"Any advancements in this area will directly benefit patients," Jacobs said. Rush University Medical Center has an active research program testing different materials for components in joint replacement devices.

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