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Sudden Infant Death Tied to Brain Chemical Alert for Breathing

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By Nicole Ostrow

Feb. 2 (Bloomberg) -- The sudden death of sleeping infants may be linked to lower levels of the brain chemical serotonin, which plays a part in regulating breathing and heart rate during slumber, a study found.

Autopsies showed babies who died of sudden infant death syndrome, or **SIDS**, had serotonin levels that were 26 percent lower than those who died from other known causes, researchers reported today in the **Journal of the American Medical Association**. The researchers said low serotonin levels may impair a baby's response to the risk from breathing in exhaled carbon dioxide when they sleep in a face-down position.

Sudden infant death syndrome is the leading cause of death in the U.S. in babies between the ages of one month and a year, according to researchers. Today's findings may help doctors identify infants who might have an increased risk for SIDS and enable scientists to develop treatments to correct the deficiency in serotonin, the researchers said.

SIDS "should not be called a mystery any more. It's a disease process that we can study," said researcher **Hannah Kinney**, a neuropathologist at Children's Hospital Boston and a professor of pathology at Harvard Medical School, in a telephone interview today. "SIDS, at least in the majority of cases, is an intrinsic problem of the brainstem."

Unexplained

Sudden infant death syndrome is a fatality that remains unexplained after a complete autopsy and death scene investigation, the authors wrote. Typically the baby is found dead after sleeping.

The number of infants dying from SIDS has fallen **50 percent** since the early 1990s, when public health officials launched the "**Back to Sleep**" program that encouraged parents to put their infants to sleep on their backs, according to the National Institutes of Health. Still, in the past decade, the number of babies who died from SIDS has reached a plateau, the authors wrote. They cited a U.S. SIDS rate of 0.54 per 1,000 live births.

In today's study, researchers measured levels of serotonin and an enzyme that helps make serotonin called tryptophan hydroxylase in the brains of 35 infants who died from SIDS. They compared that with five babies who died from identifiable causes and five who died in the hospital of insufficient oxygen supply.

They found that babies who died from SIDS had lower serotonin levels in their brainstems than the five infants who died from known causes. They also found that tryptophan hydroxylase levels were 22 percent lower in those who died from SIDS, the study showed.

Not Chronic

Comparing those who died from SIDS with those who died while in the hospital showed that SIDS isn't caused by a chronic illness or chronic insufficient oxygen, Kinney said.

Most of the babies who died from SIDS also had one or more "external" risk factors for the syndrome, sleeping on their stomach or side, sharing a bed or having a trivial illness before death, the authors wrote.

"The baby looks normal during the day; there's nothing that would tell you that baby is going to die

of SIDS that night," said Kinney in a statement. "There's something about sleep that unmasks the defect, which we believe is in serotonin circuits."

Low levels of serotonin may hamper the function of the circuits in the brain that regulate breathing, heart rate, temperature and blood pressure during sleep. That may put a baby at risk for dying from rebreathing exhaled carbon dioxide while sleeping on their stomachs or overheating from too many clothes.

Getting Fresh Air

Serotonin pathways in the brain normally cause a baby who is breathing carbon dioxide to stir and turn its head, allowing the infant to get fresh air. A baby with low serotonin levels may not be aroused to move, the researchers said.

Future studies may determine the causes of these low serotonin levels, Kinney said.

Parents may still help prevent SIDS by not drinking alcohol or smoking during pregnancy, and by putting babies to sleep on their backs in cribs until they're one year old, Kinney said. It also helps to place them on firm mattresses and without toys, soft pillows or excessive blankets and clothing.

Today's study was funded in part by the First Candle/SIDS Alliance, the CJ Foundation for SIDS and the National Institutes of Health.

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