

Study first to confirm long-term benefits of morphine treatment in infants

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A recent study conducted by researchers at Georgia State University is the first of its kind to demonstrate that administration of preemptive morphine prior to a painful procedure in infancy blocks the long-term negative consequences of pain in adult rodents. These studies have serious implications for the way anesthetics and analgesics are administered to neonates prior to surgery. Infant rodents that did not receive preemptive pain medication prior to surgery were less sensitive to the effects of morphine in adulthood. This means that infants undergoing invasive procedures at birth that do not receive any pain medicine will require more morphine in adulthood to modulate their pain.

This study -- conducted by Anne Z. Murphy, Ph.D., a GSU Professor of Neuroscience and member of the Center for Behavioral Neuroscience, and graduate student Jamie LaPrairie -- has serious clinical implications for the more than 400,000 human infants that are admitted to a newborn intensive care unit (NICU) in the United States each year.

Past studies have shown human infants born between 25-42 weeks gestation experience on average 14 painful procedures per day during the first two weeks of life with fewer than 35 percent receiving appropriate analgesic therapy.

"While such surgical procedures in preterm infants are clearly necessary, the resulting pain and inflammation has been shown to lead to negative behavioral consequences later in life," Murphy said. "Our previous studies have shown that, just as in humans, neonatal inflammation in rodents (that did not receive preemptive pain medication) results in an increase in sensitivity to pain, stress, and decreased reaction to morphine as adults.

While evidence exists that morphine is efficacious in neonatal rodents, this is the first study to confirm the long-term behavioral benefits.

In this study, published online in *Pediatric Research*, a group of rat pups received an injection of morphine sulfate on the day of birth prior to inducing inflammation; another group received a saline injection instead. The groups were then raised identically and received identical procedures during a 60-day period. Rodents that received preemptive morphine behaved normally while those rats that received saline showed significant increases in pain sensitivity and were resistant to the pain relieving effects of morphine in adulthood.

"This tells us that morphine doesn't work very well in human children and adults that were formally in the NICU and didn't receive preemptive pain treatment, and since morphine is still the primary drug used to treat severe pain, this means that there is an entire subpopulation for which morphine doesn't work efficiently," Murphy said. "These results suggest that there are long-term benefits of providing all newborns with some sort of pain relieving medicine prior to the initiation of an invasive procedure."

Source: Georgia State University

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