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Morphine and topical anaesthesia effective in treating procedural pain in newborn infants

Researchers at The Hospital for Sick Children (SickKids) have found that intravenous morphine used alone or with a topical anaesthetic (tetracaine) effectively reduced levels of pain in newborn infants undergoing insertion of central venous catheters (central lines). This research is reported in the February 15, 2006 issue of the journal JAMA.

About 10 to 15 per cent of newborns require prolonged hospitalization for conditions such as preterm birth, congenital defects and sepsis (a blood stream infection). As part of their medical care, these infants are often exposed to multiple invasive procedures that may be painful.

"It was not so long ago that infants routinely underwent painful procedures without the benefits of analgesia. Our previous studies showed that infants do feel extreme pain, that they remember this pain and that it affects their future pain responses," said Dr. Anna Taddio, the study's lead author and principal investigator, a SickKids scientist and pharmacist, and an assistant professor of Pharmacy at the University of Toronto.

"Within the last decade, the pendulum started to swing in the other direction, and pain relievers began to be used more liberally in infants. However, more information was needed about the benefits and risks of the different treatment options. We undertook this study to determine the most effective way to manage pain in infants undergoing central line placements and to delineate the side effects associated with their use," said Dr. Taddio.

The research team studied the relative efficacy and safety of a topical anaesthesia (tetracaine) and intravenous opioid analgesia (morphine), used alone or in combination, for management of pain in newborns undergoing insertion of a central venous catheter. Many hospitalized newborns require central lines for the administration of medication

and nutrition. The randomized, double-blind, controlled trial included 132 ventilated newborns in the neonatal intensive care units at SickKids and Mount Sinai Hospital, both located in Toronto, Canada, between June 2000 and July 2005.

The amount of pain was determined by measuring the proportion of time the newborns displayed facial grimacing (brow bulge) during different phases of the central line insertion (skin preparation, needle puncture and recovery).

"We found that morphine, or a combination of morphine and tetracaine, to be the most effective in treating the infants' pain during central line placement. Topical anaesthesia (tetracaine) alone was found to be a weak analgesic. This data can be used to support evidence-based protocols for the management of pain during central line placements in infants," said Dr. Taddio. "We believe morphine was more effective because it reduced the sensory input derived from the multiple phases of the procedure, while tetracaine decreased sensation from the needle puncture site alone."

Both medications were associated with side effects: morphine caused mild respiratory depression and tetracaine caused erythema (abnormal redness of skin).

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Other members of the research team included Amelia Yip and Dr. Patrick McNamara from SickKids, Charlene Lee and Dr. Vibhuti Shah from Mount Sinai Hospital, and Dr. Boriana Parvez from Maria Fareri Children's Hospital, Valhalla, New York.

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SickKids Foundation is the largest non-governmental granting agency in child health in Canada. Established in 1972, the Foundation has granted over \$500 million to The Hospital for Sick Children and over \$65 million to researchers across the country. The mission of the Foundation is to inspire our communities to invest in health and scientific advances to improve the lives of children and their families across Canada and around the world.

The Hospital for Sick Children, affiliated with the University of Toronto, is Canada's most research-intensive hospital and the largest centre dedicated to improving children's health in the country. Its mission is to provide the best in family-centred, compassionate care, to lead in scientific and clinical advancement, and to prepare the next generation of leaders in child health. For more information, please visit <http://www.sickkids.ca/>.
