

From ENDO 2016: Attention Deficit after Kids' Critical Illness Linked to Plasticizers in Medical Tubes

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Children who are often hospitalized in intensive care units are more likely to have attention deficit disorders later, and new research finds a possible culprit: a high level of plastic-softening chemicals called phthalates circulating in the blood. The researchers, presented their study results Friday at The Endocrine Society's 98th annual meeting in Boston, suggest these chemicals, which are added to indwelling medical devices such as plastic tubes and catheters, seep into the child's bloodstream.

"Phthalates have been banned from children's toys because of their potential toxic and hormone-disrupting effects, but they are still used to soften medical devices," says lead researcher Sören Verstraete, MD, a PhD student at KU (Katholieke Universiteit) Leuven in Leuven, Belgium. "We found a clear match between previously hospitalized children's long-term neurocognitive test results and their individual exposure to the phthalate DEHP during intensive care."

Di(2-ethylhexyl)phthalate, or DEHP, is the most commonly used plastic softener in medical devices made of polyvinyl chloride (PVC). Verstraete called the use of medical devices containing this phthalate "potentially harmful" for the brain development and function of critically ill children. "Development of alternative plastic softeners for use in indwelling medical devices may be urgently indicated," he said.

Their study included 100 healthy children and 449 children who received treatment in a pediatric intensive care unit (PICU) and underwent neurocognitive testing four years later. Most of the PICU patients were recovering from heart surgery, but some had sustained accidental injuries or had severe infections. The researchers measured blood levels of DEHP metabolites, or byproducts. Initially they performed the blood tests in the healthy children and 228 of the patients while they were in the PICU. Patients had one to 12 medical tubes in the PICU and ranged in age from newborn to 16 years.

The investigators found that DEHP metabolite levels were not detectable in the blood samples of healthy children. However, at admission to the PICU, the critically ill children, already connected to catheters, had levels that Verstraete called "sky-high." Although the DEHP levels decreased rapidly, they remained 18 times higher until discharge from the PICU compared with those of healthy children, he said.

Then the researchers conducted statistical analyses that adjusted for the patients' initial risk factors that could influence the neurocognitive outcome as well as length of stay, complications and treatments in the PICU. A high exposure to DEHP during the PICU stay, according to Verstraete, was strongly associated with attention deficit found at neurocognitive testing four years after discharge. They validated this finding in a different group of 221 PICU patients.

"This phthalate exposure explained half of the attention deficit in former PICU patients," he says, adding that other factors may account for the other half.