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Opioid receptor gene variations associated with neonatal abstinence syndrome severity

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A new study led by researchers at Boston Medical Center (BMC) indicates that variations in opioid receptor genes are associated with more severe neonatal abstinence syndrome (NAS) in newborn babies. The findings, published online in *Drug & Alcohol Dependence*, could help lead to the development of individualized treatment plans tailored to each infants' risk of requiring medication to curb their NAS symptoms, which could help improve these patients' outcomes and reduce how long some stay in the hospital.

NAS is present in newborn babies who have been exposed to opioids during pregnancy. While some infants require no medication to curb their symptoms after they are born, others may require two or more medications and weeks of hospitalization before they can be discharged. Nearly one in five women in the US now take an opioid medication at some point during their pregnancy, both by prescription and illicit opioids, which has contributed to a tripling in the rate of NAS over the past decade.

"In adults, we know that at least 50 percent of one's risk for opioid dependence is genetic, which is why it would make sense that infants respond differently to opioid medication exposure," said Elisha Wachman, MD, a neonatologist at BMC and who served as the study's lead author.

The multi-center study involved the examination of 86 pairs of full-term, opioid-exposed newborns and their mothers who were taking prescribed

methadone or buprenorphine for at least 30 days prior to delivery. DNA samples were collected from all participants and baseline characteristics about the infants. The infants were scored every 3-4 hours with a modified Finnegan NAS scale and were treated according to institutional NAS treatment protocols. Length of hospital stay (LOS) and need for treatment with two or more medications were chosen to reflect the overall severity of NAS.

The results of these scores demonstrated that variations in two opioid receptor genes in infants were associated with worse NAS severity, which meant that they required two medications to treat their symptoms and had a longer LOS by 5.8 days. Infants of mothers with a specific variation also played a role in NAS severity, with a longer LOS by 6.6 days. Conversely, two variations led to shorter LOSs. The identified variations were able to explain 15 percent of the difference seen in LOS among these infants.

The researchers urge, however, that further large-sample testing is needed before this genetic testing can be incorporated into clinical practice.

"A combination of clinical and genetic factors are likely responsible for the variability we see among infants with NAS," said Wachman, who also is an assistant professor of pediatrics at Boston University School of Medicine. "Once additional key clinical and genetic factors are identified, infants who are determined to have a low risk of requiring medication can be sent home without prolonged monitoring, and those who are predicted to have a difficult clinical course can be started on more aggressive treatment earlier, which will lead to shorter hospitalizations and improved outcomes."

Provided by Boston University Medical Center