Evaluation of New Hanover Regional Medical Center’s Neonatal Abstinence Syndrome Protocol in neonates with prenatal exposure to methadone versus buprenorphine

Bridges S, Farrington E, Mirrielees M
New Hanover Regional Medical Center, Wilmington, North Carolina

Background: With the increasing prevalence of opioid use in pregnancy and use of medication assisted treatment (MAT) for opioid dependence, the incidence of neonatal abstinence syndrome (NAS) has increased significantly within the past decade. Because this institution is a regional referral site for NAS cases, this institution implemented a standard protocol for the treatment of NAS in August 2013. Though this protocol has had significant success since its implementation, we have identified a shift in the primary substance used for MAT in pregnant women within our region, now seeing more cases of mothers on buprenorphine for MAT than those on methadone. This shift has brought forth many questions about whether or not there may be a difference in NAS characteristics between buprenorphine exposed and methadone exposed neonates and a potential place for empiric treatment or changes in the current protocol.

Objective: This study evaluated the impact of this institution’s current NAS protocol on hospital length of stay and duration of the protocol in neonates with prenatal exposure to methadone versus buprenorphine.

Methods: This IRB-approved retrospective review evaluated neonates born between September 1, 2013 and August 31, 2018 to mothers enrolled in a methadone or buprenorphine medication-assisted treatment program during their pregnancy. This single-center study was performed at a community-teaching tertiary care hospital with a level III NICU, and the study population included both the neonate and the mother as the study dyad. The primary outcomes were hospital length of stay (LOS), symptom onset, severity, duration, and treatment course of neonates with NAS who were prenatally exposed to buprenorphine compared to methadone. Secondary outcomes that were assessed include the effects of polysubstance use, family presence, breastfeeding, mother’s narcotic dose on hospital LOS, neonate morphine requirements, time to initiation of NAS protocol, and duration of NAS protocol.

Results: Over the study period, 590 newborns within the mother/baby unit, pediatric unit, or neonatal intensive care unit had an ICD9 or ICD10 code for neonatal abstinence syndrome. Of these, 174 mother/baby dyads met inclusion criteria (buprenorphine n=119, methadone n=56). Hospital length of stay was similar between both cohorts, with a mean length of stay of 19.9 days in the buprenorphine group compared to 23.0 days in the methadone group (p=0.057). A significant difference of 4 days was found between the buprenorphine and methadone cohorts in the primary endpoint of NAS Protocol length. For neonates who were prenatally exposed to buprenorphine and started on the NAS Protocol, the average protocol duration was 14.3 ± 1.7. In comparison, neonates who were initiated on the NAS protocol secondary to prenatal exposure to methadone were sustained on the protocol for a mean of 18.3 days ± 3.3 days. No correlation was found between polysubstance use, the study drug dose, hospital length of stay, or NAS protocol duration. A statistically significant correlation was observed with higher NAS scores on Day 3 predicting a longer duration of the NAS Protocol (P < 0.001).

Conclusions: Neonates with neonatal abstinence syndrome and prenatal exposure to buprenorphine needed to be on the NAS protocol for a shorter time than those with prenatal exposure to methadone. While neonates in the buprenorphine cohort had a shorter hospital length of stay than the methadone cohort, this was not statistically significant.