

# The obstetrical and neonatal impact of maternal opioid detoxification in pregnancy

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**OBJECTIVE:** The purpose of this study was to analyze the obstetric and neonatal impact of an opioid detoxification program during pregnancy, as well as to examine variables associated with successful opioid detoxification.

**STUDY DESIGN:** This is a retrospective cohort study of women electing inpatient detoxification and subsequently delivering at our hospital from Jan. 1, 2006, through Dec. 31, 2011. Detoxification was considered successful if women had no illicit drug supplementation at the time of delivery. Maternal characteristics were ascertained by chart review and analyzed for variables associated with success. Obstetric and neonatal outcomes were also assessed based on maternal success at delivery.

**RESULTS:** Of the 95 women during the study period with complete data, 53 (56%) were successful. There were no demographic or social risk factors identified associated with success. Women with successful

detoxification at delivery had longer inpatient detoxification admissions (median 25 vs 15 days,  $P < .001$ ) and were less likely to leave prior to completion of the program than women who had relapsed at delivery (9% vs 33%, respectively,  $P < .001$ ). Infants of mothers who were successfully detoxified had shorter hospitalizations (median 3 vs 22 days,  $P < .001$ ), lower maximum neonatal abstinence syndrome scores (0 vs 8.3,  $P < .001$ ), and were less likely to be treated for withdrawal (10% vs 80%,  $P < .001$ ).

**CONCLUSION:** Opiate detoxification in pregnancy requires a significant time commitment and extended treatment, however, can be successfully achieved in compliant parturients. Importantly, maternal demographics and drug histories do not portend success, supporting continued opiate detoxification being offered to all women expressing intent.

**Key words:** drug use in pregnancy, methadone detoxification, opioid detoxification

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Maternal opioid use during pregnancy is a significant public health concern with implications for both maternal and fetal health. According to the 2010 National Survey on Drug Use and Health, approximately 4.4% of pregnant women were current illicit drug users.<sup>1</sup> Opioid abuse in pregnancy has been associated with a multitude of adverse outcomes for both the mother and fetus, including preterm birth, fetal demise, intrauterine growth restriction, placental abruption, and neonatal

abstinence syndrome (NAS).<sup>2</sup> Furthermore, maternal abuse during pregnancy places the pregnant woman at an increased risk for partaking in high-risk behavior to support her drug addiction, including prostitution, theft, and violence. These behaviors place the woman at risk for acquiring sexually transmitted diseases, for becoming the victim of violence, as well as legal ramifications.<sup>3</sup>

Methadone has been the recommended first-line treatment for pregnant women with opioid addiction since the 1970s, with the goal of reducing adverse outcomes associated with uncontrolled narcotic withdrawal. Because of its long half-life, methadone effectively suppresses maternal cravings and can be administered in a controlled setting once daily. However, infants exposed to methadone are at significant risk for adverse outcomes including preterm birth, small for gestational age, neonatal intensive care unit admissions, as well as NAS.<sup>4-9</sup> NAS complicates 60-90% of infants exposed to methadone in utero and is characterized by central nervous

system irritability, respiratory distress, and autonomic dysfunction, often requiring several weeks of neonatal opiate solution.<sup>9</sup> Opioid detoxification provides an alternative approach in well-selected patients who desire decreased opioid dosing with resultant decreases in neonatal complications.<sup>10,11</sup>

For many years, our group has offered pregnant opioid users inpatient hospitalization with slow taper of their methadone dosage, with the goal of reducing the likelihood of NAS.<sup>10,11</sup> The main argument against such a strategy has been that it might predispose to relapse, with women going back to illicit heroin use.<sup>3,7,12</sup> As this is a valid concern when caring for such a high-risk population, we sought to determine if certain patient characteristics could be used to better identify parturients likely to be successful with methadone detoxification, or conversely, who might be better served by a methadone maintenance program. Such information would be useful for counseling women interested in opioid detoxification or maintenance.

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## MATERIALS AND METHODS

We conducted a retrospective cohort study of all pregnant opioid users who underwent inpatient opioid detoxification with methadone from Jan. 1, 2006, through Dec. 31, 2011, and who subsequently delivered at our institution. At our hospital, pregnant women with a history of substance use are followed up by a multidisciplinary medical and social case management team of physicians, nurse practitioners, drug counselors, and social workers. As part of this program, inpatient hospitalization and detoxification is offered to all pregnant opioid users as well as women currently enrolled in a methadone maintenance program. Contraindications to detoxification include fetal growth restriction, oligohydramnios, significant maternal psychiatric illness, or a prior unsuccessful detoxification attempt. All other pregnant opioid users are offered inpatient detoxification. Prior to making their decision, women are noncoercively counseled about potential benefits of reducing fetal opioid exposure and about the hazards of uncontrolled maternal opioid use. Regardless of their decision, women continue to receive the multidisciplinary social services offered to all pregnant women with a history of substance abuse.

Women who elect to undergo detoxification are admitted to the hospital, and detoxification with methadone is conducted according to a previously published protocol.<sup>10</sup> The initial dose of methadone is selected based on reported history of use and any signs or symptoms of opioid withdrawal. Methadone is distributed twice daily with tablets crushed in orange juice to blind women as to the dose they receive. Signs and symptoms of withdrawal are typically treated by increasing the methadone dose by 5-mg increments as needed. If a woman elects to undergo detoxification and has previously been on methadone maintenance, her initial dose is started at her maintenance dosage. The dose is then decreased by no more than 20% every 1-3 days as tolerated, until the woman is weaned from all methadone. Fetal surveillance is initiated in

women >24 weeks' gestation. Women are observed in the hospital for several days after all medications have been discontinued. After completion of detoxification, women are offered admission to an outpatient drug rehabilitation housing facility, however rates of maternal acceptance of this program were unable to be determined. Nurse practitioners and drug counselors continue to follow up each woman in conjunction with a maternal-fetal medicine specialist. All women with a prior or current illicit drug use, regardless if they complete detoxification, elect methadone maintenance, or continue illicit substance use, are followed up in a dedicated clinic by these same specialists.

For the purposes of this study, successful detoxification was defined as no maternal illicit drug supplementation at the time of delivery. This was determined by maternal admission of relapse, maternal urine toxicology, or fetal meconium toxicology, with any one finding determining illicit supplementation. Women who were actively undergoing detoxification at the time of delivery or on methadone maintenance at the time of delivery were considered successful. Women who underwent inpatient detoxification were identified by records maintained by our program. The medical records were reviewed for maternal demographics and maternal drug history, including length of use, route of administration, and amount of use. The maternal inpatient record was reviewed for pertinent data, including infections such as hepatitis B or C, initial methadone dosage, duration of hospitalization, and success of detoxification. The delivery record was reviewed for obstetrical data as well as maternal relapse. All infants received drug testing and were followed up for evidence of withdrawal. The newborn record was also reviewed for duration of hospitalization, maximum NAS score, and need for opioid treatment for withdrawal symptoms. NAS scores were determined by physical examination by trained pediatric providers according to the Finnegan scoring system.<sup>4</sup>

Statistical analysis included Pearson  $\chi^2$ , Student *t* test, Cochran-Mantel-Haenszel  $\chi^2$  for trend, and Wilcoxon rank sum. *P* values < .05 were considered significant. Analysis was performed using software (SAS 9.2; SAS Institute Inc, Cary, NC). This study was approved by the institutional review boards of the University of Texas Southwestern Medical Center and Parkland Hospital.

## RESULTS

During the study period, 95 women delivered at our hospital with maternal and neonatal outcomes available for analysis, of whom 53 (56%) were successful. Maternal characteristics were analyzed for variables that were associated with successful detoxification. Maternal demographic characteristics are presented in Table 1. There were no differences in maternal age, ethnicity, or nulliparity between those women who were drug free at the time of delivery as compared to those who tested positive for illicit drugs. When maternal drug history was analyzed, there was no difference in prior maternal substance use. Intravenous opioid use (as opposed to intranasal or oral ingestion), total amount of daily use, and years of use were not different between the 2 groups. Women with illicit substance use at delivery were more likely to have a positive hepatitis C antibody (64% vs 40%, *P* = .02) while human immunodeficiency virus, syphilis, and hepatitis B seropositivity did not differ.

Methadone detoxification data are presented in Table 2. The median gestational age upon admission for detoxification was 20 weeks, and this did not differ according to success of detoxification (*P* = .80); nor did the maximum methadone dosage required, which was 40 mg per day in each group (*P* = .91). The duration of hospitalization to complete detoxification was significantly longer in those who were successful as opposed to those who relapsed. Those women who remained free of opioid use at delivery required a median of 25 days to complete detoxification as opposed to 15 days in those women who subsequently relapsed (*P* < .001). This is

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