

Collaborative and Compassionate Care for Maternal Substance Use and Substance Exposed Newborns

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Outline

- Overview: National and Local Statistics “A crisis of epic proportions”
- Drugs of abuse
- Approach to the pregnant opioid dependent woman
- Management of the opiate-exposed neonate

Overview

Pain is a significant public health problem that costs society at least \$560-\$635 billion annually (an amount equal to about \$2,000.00 for everyone living in the U.S.).

Every 25 minutes a baby is born with opiate withdrawal in this country, a 5-fold increase since 2000 (*Patrick et al, 2015*)

- Drug distribution through the pharmaceutical supply chain:
 - 1997: 96 mg morphine per person
 - 2007: 700 mg morphine per person, an increase >600%
- This 700 mg morphine per person is enough for everyone in the US to take a 5mg dose of Vicodin every 4 hours for 3 weeks
- Medical services for people with opioid dependence diagnoses skyrocketed more than 3,000% between 2007 and 2014 (*Fair Health, Inc. 7/16*)

Massachusetts Data

- The rate of reported prenatal opiate exposure in Massachusetts rose from 2.6 per 1,000 hospital births in 2004 to 14.7 in 2013, an increase of more than 500%
- However, based on hospitalization figures, researchers estimated a higher rate: that more than 1,300 Massachusetts babies or about 17.5 per 1,000 hospital births were born with heroin and other opioids in their system in 2013.
- Nationally, the figure is five babies out of every 1,000 births
- The New England region (of which Massachusetts is the most populous) has the second highest
- The average length of stay in Massachusetts for an infant requiring treatment for NAS is 19 days, with an average cost (2013) of \$30,000

Franca UL, Mustafa S, McManus ML. The growing burden of neonatal opiate exposure on children and family services in Massachusetts. Child Maltreatment. 2016 Feb;21(1):80-4.

Boston Globe, Drug addicted babies in Massachusetts are triple national rate. June 19, 2014, <https://www.bostonglobe.com/news/nation/2014/06/18/massachusetts-infants-born-with-opiates-system-three-times-national-rate-analysis-finds/wmfYrNDnWI8nposyOi9mCK/story.html>.

Patrick SW, Davis MM, Lehmann CU, Cooper WO. Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. Journal of Perinatology. 2015 Aug;35(8):667.

Franca et al. 2016, ibid.

Opioids in Pregnancy

- 14.4% of pregnant women (private insurance), and 21.6% (medicaid) were dispensed an opioid at some point during pregnancy
- Data from nationwide US health insurer (left), medicaid (right)

Drugs of Abuse

Oxycontin

- Time-release version of Oxycodone
- Approved by the FDA in 1995 (Purdue Pharma);
- Abuse deterrent formulation developed in 2010 and approved by the FDA April 2013; generic versions rejected April 2013
- 1996: 45 million in sales 2010: 3.1 billion in sales
- US consumes 81% of world's supply of Oxycodone (2009) (98% of the world's supply of hydrocodone) *International narcotics control board, 2010*
- 40% of oxycontin abuse occurs among relatives and friends who have prescriptions
- \$30 per pill on the streets (generic oxycodone and hydrocodone: \$6-8 per pill)

Hydrocodone

- Time-release hydrocodone, meant to treat moderate to severe pain (abusers can crush to receive immediate effect)
- Unlike Vicodin, patients won't suffer from Tylenol overdose
- Zogenix Zohydro
- Pfizer Embeda
- TEVA Vantrela
- Collegium Pharm DETERx
- Purdue Pharma Hysingla

Heroin

- Heroin purity on the street has increased from 10-20% ten years ago to 60-70% today, resulting in addiction from snorting *without* intravenous use
- Contaminated with other drugs (fentanyl)
- Price has decreased from \$20.00 a bag ten years ago to \$3.00. (average addict consumes 5-10 bags/day; heavy addict up to 15 bags/day; 1 bag ~ 0.1g heroin)
- Availability has increased in rural and middle class suburban areas
- Age at first use as low as 8th grade; commonly used in high school
- Deaths from heroin overdoses have doubled (2010-2012)

Opioid Abuse Potential

- Route of administration
 - Faster route, increased abuse potential IV > SQ > oral
- Drug half-life
 - Shorter half-life, increased abuse potential heroin > methadone
- Lipophilicity
 - Greater lipophilicity, increased abuse potential Heroin > methadone
- Degree of mu agonist activity the greater mu agonist activity, greater abuse potential

Approach to the Pregnant Opioid Dependent Woman

Screening

- **Obstacles**
 - Provider discomfort with posing appropriate questions
 - Fear that patients will change practice if offended by questions
 - Uncertainty of where to turn when patient screens positive
- **Solution**
 - Universal, structured self-reporting screening
 - Reduce/eliminate discomfort with discussion
 - Reduce interviewer bias
 - Reduce the stigma associated with substance use/abuse

Management Options

Methadone

- Methadone is the oldest, most widely used, and most regulated medication prescribed during pregnancy
 - Impacts on illicit opiate use
 - Decreases injection related risk taking behavior
 - Decreases criminal activity
 - Prevent fluctuation of maternal drug level
 - Stabilizes the patient who can then seek medical treatment

Buprenorphine

- Has been available in France since 1995
- Is not embryotoxic, teratogenic or impair fertility
- Lower risk of overdose and fewer drug interactions
- Needn't attend daily clinic (limit on number of patients: 275 since 7/16), may not receive counseling
- Patient drop out due to dissatisfaction
- Self-medication and Drug diversion
- Cost (\$5-7 per pill; can cost close to \$4,000 for a women taking 16mg/d for the pregnancy)

Prenatal consultation

- Identifies drug(s) of exposure
- Educates family regarding specific exposure and likely effect on fetus/newborn
- Describes NAS, treatment options and anticipated LOS
- Explores family dynamics; awareness of family members, partner
- Feeding options (breast milk vs formula)
- Social service, DCYF supports
- Tour of post-partum/ newborn unit; visitation etc
- Letter to referring practitioner, pediatrician

Neonatal Management

- Daily weight, intake and output should be determined (consider high calorie formula, soy or lactose free formula if not breast feeding)
- Implement non-pharmacologic interventions upon admission
- Consider developmental needs (OT)
- Social Services consult
- Review infectious exposures (HIV, Hepatitis B+C, STD)

Breast Feeding

- Concentrations of methadone and buprenorphine in breast milk are low/poorly bioavailable and unrelated to maternal dose (*Jansson et al. Pediatr. 2008, Lindemalm, J Hum Lact,2009*)
- Fewer breast fed infants require pharmacotherapy (*Abdel-Latif et al. Pediatr,2006*)
- Time to treat is longer and duration of therapy shorter
- Any breast milk exposure reduces LOS (*Schiff et al SPR, 2014*)

Guideline (*Hall et al Pediatr. 2014;134:e527-e534*)

- 20 hospitals throughout 6 Ohio regions (2012-2013)
- 547 treated infants: 417 managed with a weaning protocol, 130 without
- Regardless of treatment chosen, duration of treatment (32.1 to 17.7days) and LOS (32.1 vs 22.1days) reduced when protocol based weaning used
- For protocol driven patients, no difference in LOS or duration of therapy with morphine or methadone

Discharge Planning

- Discharge planning begins the day of admission
- Encourage parental involvement
- Encourage foster parents to visit
- VNA recommended
- Follow-up with PMD 2-4 days
- Consider developmental follow-up (Early Intervention)

Recommend weaning schedule for phenobarbital if applicable

Alternative Strategies

Outpatient Management

- No prospective trials; methadone drug of choice
- Select population (about 1/3 of patients)
- Outpatient program must ensure compliance
- Oral methadone (3-4 week supply) at discharge with F/U in 1 week, and gradual taper (*Vermont Children's Hospital*)
- Duration of methadone treatment was longer in the outpatient group (37 \pm 20 vs. 21 \pm 14 days) but the cumulative methadone doses were similar (*Backes et al, J Perinatol. 2011*)
- The use of outpatient treatment in highly selected patients is associated with shorter inpatient stays, but extended total duration of therapy (*Lui K. J Paediatr Child Health 2001;37(3):266-70*)

Residential Treatment Facilities

- **Lily's Place: West Virginia, 2014** (How To Create a Neonatal Withdrawal Center," written as a how-to guide to re-create Lily's Place)
 - Lily's Place provides short-term medical care to infants suffering from prenatal drug exposure and offers non-judgemental support, education and counseling to families, all at a savings to the taxpayers of West Virginia.
- **Brigid's Path: Ohio, 2015**
 - provides inpatient medical care for drug-exposed newborns, non-judgmental support for mothers, and education services to improve family outcomes

Outcomes

- There is no statistical difference in psychomotor or cognitive outcome for opiate versus non-opiate exposed children at 1-2 years
- There is no statistical difference in these parameters or observed behavioral outcomes at 3-5 years
- Small sample size

Balduccino et al, *BMJ Psychiatry*, 14(1): 104; 2014

Unresolved Issues

- Where within the hospital are these patients managed best
- Should outpatient programs be instituted before evidence supports the practice for a minority of this population
- Would residential facilities better meet the needs of the patient and society

- Is LOS or a particular drug regimen the most important variable, or is it outcome long term
- Are their neurobehavioral models or genetic markers to individualize treatment or predict outcome at a later age