

NEONATAL WITHDRAWAL AND INTOXICATION SYNDROME - MANAGEMENT

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM

- To recognise signs and symptoms of NAS, escalate and manage appropriately

2. PATIENT

- Neonate exposed to addictive substances during pregnancy

3. STAFF

- Medical, midwifery and nursing staff
- Pharmacist

4. EQUIPMENT

- Nil

5. CLINICAL PRACTICE

- Do not give naloxone (NARCAN®) at delivery to a neonate exposed to frequent antenatal opiates as it may cause acute withdrawal. If neonate is apnoeic, support respiratory function with continuous positive airway pressure (CPAP), Intermittent positive pressure ventilation (IPPV) and/or intubation
- Admit a healthy term, drug-exposed neonate with no child-at-risk issues to postnatal ward with the woman
- Obtain urine and meconium samples from neonate for drug screening if requested by the neonatal team and/or the Substance Use in Pregnancy & Parenting Service (SUPPS) team (see table 1 for time limits). This may also be requested in the Multidisciplinary Care Discussion (MCD) plan. Consent from the woman should be sought although not mandatory if testing is required to reach a medical diagnosis

Table 1- Summary of time limits for drug detection in newborn urine and meconium

Drug	Time limits of urine test
Barbiturates	24 hr (short acting) to 3 weeks (long acting)
Benzodiazepines	3-5 days
Methadone	3-5 days
Opioids including heroin	1-2 days
Amphetamines	1-2 days
Cannabinoids (Tetrahydrocannabinoid)	~5 days (may be several weeks)

(MoH GL2014_022)

- Specify screening for the following on the (urine) pathology request:
 - Opiate
 - 6 Acetyl Morphine
 - Amphetamines
 - Cocaine
 - Benzodiazepines
 - Cannabinoids
- Commence supportive treatment e.g. skin-to-skin, swaddling, quiet environment (see appendix 1)

NEONATAL WITHDRAWAL AND INTOXICATION SYNDROME – MANAGEMENT cont'd

- Provide the woman who has been exposed to addictive substances in pregnancy education on normal neonatal adaptation and behaviour, including potential withdrawal signs the neonate may develop. Breastfeeding or giving expressed breastmilk can help reduce the likelihood of neonatal adaptation problems (see appendix 2)
- Commence Finnegan Neonatal Abstinence Scale (NAS) after each feed or minimum of four hourly (involve woman in scoring process)
- Review and consider pharmacological treatment or admission of the neonate to Newborn Care Centre (NCC) (at the discretion of the paediatric team) if neonate experiences any of the following:
 - three consecutive NAS scores ≥ 8
 - a NAS score ≥ 11 on one occasion
 - clinical deterioration e.g. seizures, vomiting, inability to tolerate oral feeds
- Commence treatment at a lower threshold at the discretion of the neonatal team

Pharmacological Management

- Determine if maternal drug is predominantly opiate or non-opiate based. Urine and meconium drug screen may also provide guidance but results may be delayed. Review maternal notes for drug and alcohol assessment by SUPPS team
- Initiate pharmacological treatment in the NCC and continue on the postnatal ward if the neonate is stable, decreasing separation time (see appendix 2)
- Administer morphine as the first line drug if opiate based withdrawal:
 - Commence 0.5 mg/kg/day in four divided doses orally. Give intravenous (IV) if excessive vomiting. No correction for IV dosing is needed
 - Increase by 0.2 mg/kg/day if NAS score is persistently > 8
 - Commence cardiorespiratory monitoring once 0.8 mg/kg/day is reached and discuss with neonatal team
 - Notify neonatal team if NAS score > 11 . Medications may need to be increased
 - Add phenobarbitone at 2.5 mg/kg/dose twice a day if NAS score on morphine of 0.9mg/kg/day is still > 8 . Loading dose is not necessary when phenobarbitone is added to morphine regime
- Administer phenobarbitone as the first line drug in non-opiate based withdrawal. Give a loading dose of 10 mg/kg when phenobarbitone is the first line drug, followed 24 hours later by a maintenance dose of 2.5mg/kg/dose twice a day

Weaning of Pharmacological Management

- Start weaning if clinically stable and NAS score is persistently < 8 for 48-72 hours
- Decrease phenobarbitone first (if dual treatment) by 10% every 2-3 days or as tolerated by neonate. Morphine is often decreased as an outpatient after phenobarbitone is ceased but may be weaned while the neonate is an inpatient. A neonate who is otherwise clinically stable but receiving both morphine and phenobarbitone, may be discharged home under close supervision of the SUPPS team

Discharge from Hospital

- Recommend neonate remains in hospital (as per appendix 2) to allow NAS scoring and identification of any social issues and organisation of support services and follow up
- Decide length of stay on an individual basis. This is dependent on history of maternal use, neonatal clinical signs and maternal MCD plan
- Ensure a discharge planning meeting involving medical, midwifery/nursing, perinatal mental health, social work and SUPPS team has occurred prior to discharge

NEONATAL WITHDRAWAL AND INTOXICATION SYNDROME – MANAGEMENT cont'd

- Arrange discharge on NAS medications if appropriate. These are prescribed WEEKLY and prescriptions must be telephoned through to RHW Pharmacy (ext. 26716) before pick up. Prescribe sufficient quantity of medication for 10 days on discharge
- Order separate prescriptions for each medication. Numbers must be written in words to avoid errors (as per S4/S8 drug requirements)
- Arrange follow up for neonate who lives in the local area, at Sydney Children's Hospital Outpatients Department (level 0) with the SUPPS team. Clinics are held every Monday and Thursday from 1400 hours. Appointments are to be organised by the SUPPS team prior to discharge (appointments can also be made by parents or foster carers if needed)
- Assist SUPPS team in arranging follow up appointments for the neonate discharged out of area

6. DOCUMENTATION

- Medical Record
- Neonatal abstinence score form

EDUCATIONAL NOTES

- Neonatal Abstinence Syndrome (NAS) refers specifically to a withdrawal syndrome typically seen in infants of opioid-dependent women. It may also occur in infants exposed to non-opioid substances such as alcohol, cannabis, caffeine and benzodiazepines
- The most commonly used tools to monitor drug withdrawal are the Finnegan and Modified Finnegan Scores. Finnegan Score has been validated only for term/near term neonates and opiate exposure. However, due to lack of any other methods, the Finnegan's Score is used to monitor both preterm and non-opiate exposed neonates. Be aware amphetamine affected neonates may have falsely low Finnegan Scores
- Epidemiological studies estimate that between 1-1.5% of women are known to use drugs of dependency regularly during pregnancy. Recreational users are much more common³
- Most (>80%) of drug-using women who deliver at RHW are known antenatally to the SUPPS team
- Detailed and non-punitive drug and alcohol history during the antenatal period is more indicative of drug use than maternal or neonatal toxicology^{7,8}
- Opiate screens do not cover methadone or buprenorphine. Other types of testing (e.g. hair, nails, amniotic fluid etc) remain experimental⁷
- Onset of withdrawal symptoms varies and is dependent on drug, dose, half-life and timing of last drug dose prior to birth
- Stimulants such as amphetamine-like substances may cause a "crash" instead of withdrawal. Neonates may be very sleepy and feed poorly rather than exhibit the symptoms typical of opiate withdrawal^{2,5}
- More than 50% of pregnant drug-using women also have co-existing psychiatric morbidity, most commonly depression, so the effects of psychotropic agents on the neonate will also need to be taken into account. SSRI/SNRI withdrawal causes different symptomatology⁴. Refer to Antidepressants in Pregnancy – Neonatal Observations and Interventions in Pregnancy LOP for management guidelines.

Breastfeeding^{12,13} – general principles:-

- NHMRC Infant Feeding Guidelines 2012 state that 'maternal use of nicotine, alcohol, ecstasy, amphetamines, cocaine and related stimulants has been demonstrated to have harmful effects on breastfed infants'. These are noted to be 'maternal conditions that may justify permanent avoidance of breastfeeding'. However, it is important to weigh the benefits of breastfeeding against the risk of substance exposure in breastmilk and risk may depend on several factors, including the types of substances involved, patterns of use, dose and age and health of the infant

NEONATAL WITHDRAWAL AND INTOXICATION SYNDROME – MANAGEMENT cont'd

- Women who choose to breastfeed while using substances of dependency must^{12,13}:
 - be managed with a harm minimisation approach
 - be informed about the likely/known effects of the substances on her lactation and her infant
 - be assisted to minimise exposure of the neonate to the effects of these substances
 - have the opportunity to receive integrated services from drug and alcohol, paediatric, lactation and other health professionals with breastfeeding expertise
 - have cultural considerations taken into account. For some women from cultures where breastfeeding is normal, they cannot consider a situation where they do not breastfeed

Signs and symptoms of NAS include^{6,7,8}

Central nervous system (CNS) signs:

- Hyperirritability and hyperactivity
- Increased muscle tone
- Exaggerated reflexes
- Tremors, myoclonic jerks (convulsions more frequent in non-opiate withdrawal)
- Disturbed sleep
- Abnormal electroencephalogram (EEG)

Respiratory signs:

- Tachypnoea, irregular respirations
- Stuffy nose, sneezes

Gastrointestinal signs:

- Disorganised suck and swallow
- Vomiting and diarrhoea (dehydration, electrolyte imbalance, buttock excoriation)
- Hyperphagia – this usually starts after a week and settles in about 3-4 weeks

7. RELATED POLICIES / PROCEDURES / CLINICAL LOPs

- Neonatal Abstinence Syndrome Guidelines NSW Health GL2013_08
- Antidepressants in Pregnancy – Neonatal Observations and Interventions in Pregnancy - Management
- Neonatal Observations Outside Newborn Care
- Guidelines for the Management of Substance Use During Pregnancy Birth and the Postnatal Period NSW Health GL2014_022 (currently being updated – update due for release in September 2021)

8. RISK RATING

- Medium

9. NATIONAL STANDARD

- Standard 2 - Partnering with Consumers
- Standard 4 - Medication Safety
- Standard 5 - Comprehensive Care

NEONATAL WITHDRAWAL AND INTOXICATION SYNDROME – MANAGEMENT cont'd

10. REFERENCES

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Approved Quality & Patient Safety Committee 17/2/11
Endorsed Newborn Care Management Committee 8/12/10
Revised December 2010
Approved Quality Council 17/3/03

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Appendix 1: Supportive care

Aligned with Modified Finnegan Scoring System – only symptoms that respond to supportive therapy are:-

System	Sign	Suggested supportive measure
Central nervous system disturbances	Excessive or high pitched crying	Soothe baby with swaddling, talk quietly/sing/hum, hold baby firmly to body, rock gently use an infant sling. Reduce environmental stimuli (slow movements, reduce lighting and noiselevel).
	Sleeplessness	Reduce environmental stimuli, swaddle baby, minimise handling, rock gently and encourage skin to skin cuddles with parent(s).
	Excoriation (chin, knees, elbow, toes, nose)	Apply protective skin barriers to affected areas to protect skin and prevent damage.
	Myoclonic jerks, tremors, jitteriness, irritability	Prepare everything prior to disturbing the infant to minimise handling. Slow movements, reduced lighting, reduced noise levels, soft music, massage, relaxing baths.
Gastrointestinal disturbances	Excessive sucking	Agitation may result in scratching of the skin. Use of mittens will minimise sucking of the fists, keep hands clean and consult with parents about the use of a pacifier.
	Poor feeding (infrequent/uncoordinated suck)	Feed on demand. Reduce environmental stimuli during feeding. Frequent small feeds with rest between sucking. Assess coordination of suck/swallow reflex – support cheeks and jaw if necessary. Refer to Lactation Consultant as required. Monitor weight loss closely during withdrawal as feeding disturbances are common. Assess hydration. If caloric intake appears insufficient with breastfeeding alone use supplemental expressed breast milk or formula until adequate caloric intake is achieved. If insufficient fluid intake refer to medical staff.
	Regurgitation/vomiting	Wind or burp baby regularly when he/she stops sucking and at end of feed. Do not over feed.
	Peri – anal excoriation due to loose stools/diarrhoea	Change baby’s nappy with every feed, use barrier creams. It may be necessary to expose baby’s buttocks to air to dry.
	Pain	Provide pain relief for procedures based on need as for any baby.
Respiratory/vasomotor disturbances	Sweating	Clean skin regularly, dry clean clothing and bedding to prevent skin infection.
	Fever – temperature greater than 37.2°C	Ensure adequate hydration and reduce environmental temperature. Dress in light clothing and use lightweight, soft cotton fabric to swaddle or nurse skin to skin with mother. Nurse in an open cot with adequate ventilation.
	Nasal stuffiness/excessive nasal secretions	Use gentle suction if nasal secretions cause obstruction to ensure adequate respiratory function.
	Nasal flaring/tachypnoea	Refer to medical staff if cyanosis or mottling observed. Avoid swaddling so that respiratory rate can be closely observed. Nurse supine unless receiving cardiorespiratory monitoring in the nursery.

Summary of treatment for infants known to be exposed to prenatal substances of dependency

Main substance of exposure	Peak effects	Pharmacological Treatment	Hospitalisation Days*	Breastfeeding
Opioids Heroin Methadone Buprenorphine	Hours to 2-3 days 2-3 days 3-4 days	Morphine +/- phenobarbitone +/- clonidine	5	Y
Benzodiazepines	1 -2 weeks	Phenobarbitone Or clonidine	5	Y
Amphetamine type Substances	Birth to 2-3 weeks	Usually not needed	5	N
Cannabis	2-3 days to 4-6 weeks	Phenobarbitone	3	Y
Antidepressants e.g. SSRIs	24 - 48 hours	Phenobarbitone	3	Y
Alcohol	Birth to ~ 3 days	Phenobarbitone	3	Y
Other drugs e.g. novel psychostimulants	Uncertain	Phenobarbitone	3	? **

* Suggested minimum hospitalisation

**Depends on type of exposure

Appendix 3

Neonatal Abstinence Scale – modified Finnegan’s

Infants of mothers known or suspected to be drug users who are showing signs of withdrawal should be scored every 4 hours. The scoring should be applied in a consistent manner by personnel who are experienced in dealing with such infants.

	Date							
System	Signs & symptoms	Score						
Central Nervous System	High-pitched cry	2						
	Continuous high-pitched cry	3						
	Sleeps <1 hour after feeding	3						
	Sleeps <2 hours after feeding	2						
	Sleeps <3 hours after feeding	1						
	Mild tremors when disturbed	1						
	Mod-severe tremors when disturbed	2						
	Mild tremors undisturbed	3						
	Mod-severe tremors undisturbed	4						
	Increased muscle tone	2						
	Excoriation (specify area)	1						
	Myoclonic jerks	3						
Generalised convulsions	5							
Metabolic/Vasomotor/Respiratory Disturbances	Fever (37.3-38.3 deg C)	1						
	Fever (>38.3 deg C)	2						
	Frequent yawning (>3-4 times in ½ hour)	1						
	Nasal snuffiness	1						
	Sneezing (>3-4 times in ½ hour)	1						
	Nasal flaring	2						
	Respiratory rate > 60/min	1						
	Respiratory rate > 60/min + retractions	2						
Gastrointestinal disturbances	Excessive sucking	1						
	Poor feeding	2						
	Regurgitation	2						
	Projectile vomiting	3						
	Loose stools	2						
	Watery stools	3						
	Total score							

Infants scoring 3 consecutive abstinence scores averaging more than 8 (e.g. 9-7- 9) or ≥12 for 2 scores require treatment. The scoring interval should be 4 hourly until the infant has been stabilised. Infants withdrawing from non-opioids frequently display similar behaviours to those withdrawing from opioids.

NOTE: Caution must be exercised before symptoms listed here are accepted as part of drug withdrawal. For example, symptoms such as fever, tachypnoea or seizures could be due to sepsis, which should be excluded first with appropriate tests.

Appendix 4: Modified Finnegan Neonatal Abstinence Severity Score guideline

System	Sign	Description – should be scored if:
Central nervous system disturbances	High pitched or excessive cry	Cries intermittently or continuously for up to 5 minutes despite caregiver intervention. Baby is unable to decrease crying within a 15 sec period using self consoling measures.
	Continuous (high pitched) cry	Baby cries intermittently or continuously for greater than 5 minutes despite caregiver intervention. NB. Since a baby's cry may vary in pitch, this should not be scored if high pitched crying is not accompanied by other signs described above.
	Sleep	Scores based on the longest period of sleep within the entire scoring interval. Include light and deep sleep (Deep – regular breathing, eyes closed, no spontaneous activity. Light - irregular breathing, brief opening of eyes at intervals, some sucking movements).
	Mild tremors when disturbed	Baby exhibits observable tremors of the hands or feet whilst being handled.
	Moderate to severe tremors when disturbed	Baby exhibits observable tremors of the arm/s or leg/s with or without tremors of the hands or feet whilst being handled.
	Mild tremors when undisturbed	(Undisturbed tremors should be assessed by observing the baby for at least 2 one -minute undisturbed periods). Baby exhibits observable tremors of the hands or feet whilst undisturbed.
	Moderate to severe tremors when undisturbed	Baby exhibits observable tremors of the arm/s or leg/s with or without tremors of the hands or feet whilst undisturbed.
	Increased muscle tone	Should be assessed when the baby is awake but not crying. There is tight flexion of the baby's arms and legs (unable to slightly extend the arms or legs).
	Excoriation	If occurs on chin, knees, cheeks, elbow, toes or nose . Score only when excoriations first appear, increase or appear in a new area. Does not include excoriated nappy area caused by loose stools.
	Myoclonic jerks	The baby exhibits twitching movements of the muscles of the face or extremities or if jerking movements of the arms or legs are observed.
	Generalised convulsions	Generalised activity involving tonic (rigid) extensions of all limbs (but may be limited to just one limb), or manifested by tonic flexion of all limbs. Generalised jitteriness of extremities is observed. Hold or flex the limbs, if the jitteriness does not stop it is a seizure. If subtle seizures are present (eye staring, rapid eye movements, chewing, fist clenching, back arching, cycling motion of limbs with or without autonomic changes) then they should be scored in this category.
Gastrointestinal disturbances	Excessive sucking	The baby shows increased (greater than 3 times) rooting (turns head to one side searching for food) while displaying rapid swiping movements of hand across mouth prior to or after a feed.
	Poor feeding	The baby demonstrates excessive sucking prior to a feed, yet sucks infrequently during feeding, taking small amounts and/or demonstrates an uncoordinated sucking reflex. Also score if the baby continuously gulps the milk and stops frequently to breathe.
	Regurgitation	Regurgitation not associated with burping occurs 2 or more times during a feed.
	Projectile vomiting	1 or more projectile vomiting episode occurring during or immediately after a feed.
	Loose stools	Scored if stool which may or may not be explosive, is curdy or seedy in appearance. A liquid stool, without a water ring on the nappy should also be scored as loose.
	Watery stools	The baby has soft, mushy, or hard stools that are accompanied by a water ring on the nappy.
	Fever	Score as per score sheet.
	Frequent yawning	The baby yawns greater than 3 times within scoring interval
	Nasal stuffiness	The baby exhibits noisy respirations due to the presence of exudate with or without a runny nose.
	Sneezing	The baby sneezed more than 3 times in the scoring interval. May occur as individual episodes or may occur serially.
	Nasal flaring	Present at any time during the scoring interval. Score only if present without other evidence of lung or airway disease.
	Respiratory rate	NB . Cannot be assessed while the baby is crying.