MaineGeneral Medical Center
Maternity & Pediatrics

Inpatient Management of the Late Preterm Newborn

I. Purpose: To establish a guideline for the management of late preterm newborn in the initial hospital setting and during the transition to the outpatient setting

Background: Late preterm (LPT) newborns, defined as those newborns born between $34^{0/7}$ weeks and $36^{6/7}$ weeks gestational age, account for 75% of all preterm births and 9.1% of all births in the United States. Preterm delivery is the most important determinant of neonatal morbidity, and newborns born within this gestational age are 7 times more likely to have newborn morbidities compared to the term newborn. Late preterm newborns are physiologically and metabolically immature at the time of birth, often lacking the self-regulatory ability to respond appropriately to the extra-uterine environment. Specific issues encountered include problems with: thermoregulation, apnea, bradycardia, hypoxic episodes, feeding problems, hypoglycemia, hyperbilirubinemia, suspected sepsis, and respiratory distress. The most common causes of delayed discharge are jaundice and poor feeding. Newborns in the LPT cohort are at increased risk for problems after discharge, with 7% - 9% being re-hospitalized within fourteen days after discharge.

II. Management:

1. Vital signs

a. Normal Parameters:
   i. Temperature 36.5 ºC (97.7 ºF)-37.4ºC (99. 3ºF) axillary
   ii. Pulse 110-160 beats/min
   iii. Respirations 40-60 breaths/min
b. Measure vital signs on admission and every 30 minutes until the condition has been stable for 2 hrs, then every 4 hours until discharge or per physician order.
c. Assess temperature within 30 minutes of age
d. Measure blood pressure on admission, and continue to take every 30 minutes until stable, then per routine care
e. If vital signs are abnormal, they should be taken every 15-30 minutes or more frequently as clinical condition warrants or as ordered, and the physician should be notified.
f. Respiratory status should be monitored for:
   i. abnormal respiratory rate
   ii. grunting, flaring, retracting
   iii. abnormal breath sounds
   iv. cyanosis (oxygen saturation should be >90% in room air)
   v. coordination with feedings
g. All newborns will undergo a pulse ox screen for complex congenital heart disease after 24 hours and before 48 hours of age.

2. Thermoregulation

a. Identify risk factors for hypothermia: prematurity, low birth weight, intrauterine growth restriction, sepsis.
b. Normal axillary temperature: 97.7°-99.3°F- (36.5-37.4° C)
c. At delivery, the newborn should be dried thoroughly with pre-warmed blanket and placed skin to skin as soon as eligible with blanket overlying mom and baby.
d. Cover the newborn's head with a hat to reduce heat loss
e. Initiate skin to skin in delivery room and encourage skin to skin as much as possible if the newborn is otherwise stable.
f. Newborn should be dressed, bundled and wearing hat at all times when not under heat source or skin to skin (STS) with mother/support person.
g. Newborns weighing <1800g should be placed in an isolette when not skin to skin with mother/support person
h. Newborn bed should be located away from drafts or air vents.
i. Check axillary temperature:
    i. Once dried and bundled in delivery room.
    ii. Every 30 minutes until stable > 97.5 °F (36.4°) for 2 hours.
    iii. Then with scheduled vital signs until stable in open crib x 24 hours, then once per shift
j. If temperature is < 97.5 °F:
    i. Place newborn under pre-warmed radiant warmer
    ii. Re-check in 30 minutes and every 30 minutes until stable >97.5 °f for 2 hours, then with scheduled vital signs every four hours for 24 hours.
    iii. If newborn is unable to maintain temperature above 97.5° without heat source in spite of appropriate clothing and bundling, notify MD and place the newborn in an isolette when not skin-to-skin with the mother.
        1. Place in warmed isolette set at 32º C. Set isolette temp. 0.5ºC higher than infant temp. Increase by 0.5ºC per hour until temp is in the normal range.
        2. Infants should remain in an isolette until they are >1800g and they can maintain appropriate temperature at an environmental temperature of <30ºC
    iv. Once transferred back to an open crib, check temperature every 30 minutes after transfer to crib until stable (>97.5oF [36.4ºC]) on 2 consecutive occasions
k. Postpone the bath until thermal, glucose, and cardiorespiratory stability is ensured, at least 6 hours after birth. When temp is stable (>97.5ºF on 2 consecutive occasions):
    i. Keep the bath duration as short as possible.
    ii. Use a sponge bath or swaddled bath.
    iii. Ensure that the bath water temperature is 100° to <104° F (38° to <40° C)

iv. Minimize or avoid drafts in the room.
v. Use pre-warmed towels for drying.
vi. Dry the newborn immediately after bathing, place a diaper and dry cap on the baby, and place eligible infant skin to skin with mother or support person with blanket covering. If STS declined wrap him/her in warm blankets.
vii. Check temperature q 30 minutes x 2 to ensure normal temperature after bath.

l. If temperature is ≥ 100.4 °F (38 °F) notify physician.

3. Glucose monitoring

a. Per Hypoglycemia Protocol for all late preterm newborns

4. Feeding

a. Breast Feeding:

i. Breast feeding should be started as soon after birth as possible. Encourage initiation of breastfeeding within one hour after birth.
ii. Encourage skin to skin contact/kangaroo care
iii. Colostrum swabbing may be used for oral care or before feeding is established. See Human Milk Swabbing Policy.
iv. Newborn may breast feed ad lib and on demand, at least 8-12 times in 24 hours.
v. Breast feeding infants should feed greater than 8 feeds per day.
vi. If baby latches, offer first breast unrestricted and offer second side after baby has finished on first side.
vii. Assess urine output and stooling pattern each shift
viii. Consider supplementation with EBM (expressed breast milk), PDHM or formula after each breastfeed until mother's milk is in and breast feeding well established if:
    1. Birth weight <2500 grams and poor feeding
    2. Temperature instability
    3. Weight loss >3% per day, or >8% total
    4. Poor weight gain
ix. Quantity of supplementation:
0-24 hours: 2-10 ml per feed
25-48 hours: 5-15 ml per feed
49-72 hours: 15-30ml per feed
73+ hours: 30-60 ml per feed or more based on milk production and ability to take. After breast feeding is going well, you may consider stopping supplement.
x. Consider fortification of EBM if:
    1. BW <2250 grams
    2. Infant consistently unable to take >150 ml/kg/d after 5 days of age.
    3. Poor weight gain after 5 days of age.
xi. If baby doesn't latch, mother should use an electric breast pump or

hand expression as soon as possible but no more than 6 hours after delivery and after every feeding (10-12x/24 hrs for 15–20 minutes.). Mom should provide expressed breast milk or colostrum to infant.

b. Evidence of successful feeding:
    i. Established maternal milk supply
    ii. Signs of milk transfer, swallowing and softening of the breast.
    iii. Signs of adequate infant hydration.
    iv. Voiding and stooling is established. (at least 6-8 weight diapers and 3-4 stools per day by day of life 5)
    v. ≤3% weight loss per day
    vi. <7-8% total weight loss

5. **PDHM Feeding:** Refer to PDHM policy

6. Formula Feeding:

a. Formula
    i. 20 cal per ounce if infant is > 2250 grams.
    ii. 22 cal per ounce if infant is < 2250 grams.
b. Newborn should feed on cues every 2-3 hours, but need to awaken infant to feed at least every 3 hours.
c. LPT newborns should feed greater than 8 times per day.
d. Feeds should be completed within 20-30 minutes.
e. Assess and document urine output and stooling pattern each shift
f. Specify volumes: Feeding minimum volumes for formula:
    i. Day Of Birth: 20-30 ml/kg /day or 5-10 ml per feed
    ii. Day of Life One: 30-60 ml/kg/day or 10-20 ml per feed
    iii. Day of Life Two-Three: 60-90 ml/kg/day or 20-30 ml per feed
    iv. Day of Life Four: 90-120 ml/kg/day or 30ml or greater per feed
    v. Day of Life Five-D/C: minimum 140 ml/kg/day and goal 150-180 ml/kg/d.
g. Consider increasing caloric density by feeding 22- to 24-cal/oz for newborns with excessive weight loss or persistently poor weight gain.

7. Hyperbilirubinemia

a. Promote and support successful breastfeeding.
b. Identify risk factors for hyperbilirubinemia.
c. Measure the total serum bilirubin (TSB) or transcutaneous bilirubin (TcB) level on infants jaundiced in the first 24 hours.
d. Obtain a TcB or TSB at 24hr after birth for all LPT newborns regardless of presence or absence of visual jaundice
    i. Plot bilirubin levels on hour-specific Bhutani Nomogram (or via BiliTool.org) for newborns >35 weeks.
    ii. For infants <35 weeks, there are no recommended guidelines from the AAP and thresholds for intervention remain controversial. Suggested guidelines are provided below, however each patient should be considered individually

Total Serum Bilirubin (mg/dL)				
	Well Infant		Sick Infant	
Weight (g)	Phototherapy	Exchange Transfusion	Phototherapy	Exchange Transfusion
1500-2000	8-12	16-18	7-10	14-16
2000-2500	12-15	18-20	10-12	16-18
>2500	As per >35 wk	As per >35 wk	13-15	17-22

e. Obtain repeat bilirubin level prior to discharge to determine rate of rise
    i. If rate of rise is >0.5 mg/dL/hr, consider initiating phototherapy
f. Treat newborns, when indicated, with intensive phototherapy or other therapies per protocol
g. Provide appropriate follow-up based on the time of discharge and the risk assessment. Additional testing may be needed to coincide with peak bilirubin levels which may occur on days 5-7 in LPT newborns

8. Evaluation of early-onset sepsis

a. Risk factors for sepsis include: Prolonged Rupture of Membranes ≥ 18 hours, less than 37 weeks of gestation, chorioamnionitis, maternal fever > 100.4 and previous delivery of an infant with invasive GBS disease.
b. Presenting signs of sepsis include: Temperature instability, lethargy, irritability, hypotonia, respiratory distress, poor perfusion, poor feeding, gastric distension, pustules or petechiae or jaundice.
c. Screening for sepsis per most current recommendations.

9. Safe Sleep

a. See separate policy.

10. <u>Discharge Criteria</u>:

Expectations for discharge should be discussed with the family on admission, educating the family about the differences in this population relative to the term infant. Although it is common for newborns to be discharged from the newborn nursery with the mother, parents should be advised that the LPT newborn may not meet discharge criteria within this designated time period.

a. Timing of discharge is individually based on feeding competency, thermoregulation, absence of medical illness and social risk factors; discharge should be delayed until the newborn is at least 48 hrs old
b. Vital signs should be documented as stable for 24 hours preceding discharge
c. Ability to maintain a normal temperature in a crib for 24-48 hours (parents should know how to take an axillary temperature)
d. Ability to feed adequately within a set period of time, coordinating sucking, swallowing and breathing while feeding
e. A formal evaluation by nursing or lactation services of breast feeding
f. At least one stool has been passed
g. Bloodspot Screening has been performed (should be performed no earlier than 24hrs after feeding is initiated)
h. Medication reconciliation if appropriate, has been completed and parents/caregivers have demonstrated the ability to administer medications
i. Parents/caregivers can identify the common signs and symptoms of illness or sepsis and demonstrate the importance of hand hygiene to reduce the risk of infection
j. Parents/caregivers are sufficiently educated on how to evaluate feeding success and what signs to look for to detect dehydration and hyperbilirubinemia
k. Hepatitis B vaccine has been administered, or if the mother is refusing, a copy of the maternal HepBsAg status is confirmed as negative
l. A car seat test has been performed per policy
m. Hearing screening has been performed and follow-up arranged if necessary
n. Any family, social or environmental risk factors have been assessed
o. Parents/caregivers are educated regarding the increased risk of SIDS and safe sleep/environment positioning
p. A source for continued follow-up within 24-48 hours after discharge has been arranged

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