

## Neonatal Morbidity Scale

Overview: The Neonatal Morbidity Scale was developed by Minde et al to evaluate the relationship between the severity of complications in premature infants and subsequent maternal-child interactions. The score is based on 20 of the most common significant problems seen at the Hospital for Sick Children in Toronto Canada.

Parameters:

- (1) convulsions
- (2) hydrocephalus
- (3) intracranial hemorrhage
- (4) perinatal asphyxia
- (5) diarrhea
- (6) necrotizing enterocolitis
- (7) meningitis
- (8) sepsis
- (9) pneumothorax
- (10) apnea
- (11) respiratory distress syndrome
- (12) chronic lung disease
- (13) cardiac failure
- (14) hyperbilirubinemia
- (15) hypoglycemia
- (16) acidosis
- (17) bleeding tendency
- (18) anemia
- (19) NPO status
- (20) tracheostomy

Scoring:

- none: 0 points
- mild condition: 1 point

- moderate: 2 points

- serious or life-threatening: 3 points

| Parameter               | Finding  | Points |
|-------------------------|--|--------|
| convulsions             | none   | 0      |
|                         | on anticonvulsive therapy but no seizures  | 1      |
|                         | 1-5 convulsions per day  | 2      |
|                         | frequent motor convulsions (> 6 per day)   | 3      |
| hydrocephalus           | none   | 0      |
|                         | hydrocephalus without increase in head circumference and good shunt function)  | 1      |
|                         | rapid increase in head size (> 2 cm per week or < 0.5 cm per day)  | 2      |
|                         | surgery with shunt inserted  | 3      |
| intracranial hemorrhage | head size rises $\geq$ 0.5 cm per day  | 3      |
|                         | none   | 0      |
|                         | intracranial hemorrhage confirmed on CAT scan or ultrasound with some deterioration in condition   | 1      |
|                         | moderate intracranial hemorrhage with signs such as irritability and head retraction or with residual signs. Signs may also include decreased hemoglobin deterioration in condition or blood in CSF. | 2      |
|                         | major intracranial hemorrhage and major symptoms (convulsions apnea); hemorrhage confirmed by lumbar puncture CAT scan or ultrasound   | 3      |
| perinatal asphyxia      | none   | 0      |
|                         | mild irritability or hypotonia intubated at birth but 5 minute Apgar > 5   | 1      |
|                         | neurological abnormalities (extensor hypertonus transient myocardial ischemia or moderate acute renal tubular necrosis)  | 2      |
|                         | cardiac arrest or prolonged attempt at resuscitation at birth or during transfer; severe neurological signs apnea or frequent convulsions; 5 minute Apgar score < 5                                  | 3      |
| diarrhea                | none   | 0      |
|                         | diarrhea noted and treated by dietary restriction only   | 1      |

|                           |   |   |
|---------------------------|---|---|
|                           | moderate dehydration requiring IV fluids  | 2 |
|                           | severe dehydration from diarrhea; loss of >= 10% body weight requiring rehydration  | 3 |
| necrotizing enterocolitis | none  | 0 |
|                           | necrotizing diagnosis on initial X-ray or blood in stools and patient put on total parenteral regimen; colostomy or ileostomy without problems                        | 1 |
|                           | active necrosis with marked distention; X-ray changes confirming necrosis; concern about perforation; ostomy with problems in functioning                             | 2 |
|                           | perforation or surgery  | 3 |
|                           | very poor condition   | 3 |
| meningitis                | none  | 0 |
|                           | meningitis well-controlled by antibiotics with sterile CSF  | 1 |
|                           | proven meningitis by positive blood cultures; condition stable or ventricular reservoir in place  | 2 |
|                           | very poor condition; shock or convulsions   | 3 |
| sepsis                    | none or antibiotics given only for suspected infection  | 0 |
|                           | mild infection with positive cultures or severe infection well controlled with antibiotics  | 1 |
|                           | sepsis confirmed by positive blood cultures with elevated WBC and condition fair; if infant's condition not substantially improved 48 hours after infection confirmed | 2 |
|                           | very poor condition with shock and/or DIC; clinical signs of septicemia   | 3 |
| pneumothorax              | none  | 0 |
|                           | drain inserted and functioning normally   | 1 |
|                           | pneumothorax with drain inserted  | 2 |
|                           | bilateral pneumothorax  | 3 |
|                           | central cyanosis before drain   | 3 |
| apnea                     | none  | 0 |
|                           | requires extra oxygen or aminophylline  | 1 |
|                           | requiring CPAP or bagging 3 times a day   | 2 |
|                           | requires ventilation  | 3 |

|                               |  |   |
|-------------------------------|--|---|
| respiratory distress syndrome | none   | 0 |
|                               | extra oxygen requirement   | 1 |
|                               | requiring CPAP   | 2 |
|                               | requires ventilation   | 3 |
| chronic lung disease          | none   | 0 |
|                               | extra oxygen delivery including oxygen catheter (low flow oxygen)                              | 1 |
|                               | nasal oxygen catheter and negative pressure box  | 2 |
|                               | confirmed on X-ray requiring ventilation   | 3 |
| cardiac failure               | none   | 0 |
|                               | requires digoxin (and diuretics) but condition stable  | 1 |
|                               | symptoms requiring Lasix and responding to indomethacin  | 2 |
|                               | intractable failure requiring vigorous treatment   | 3 |
| hyperbilirubinemia            | none   | 0 |
|                               | jaundice requiring phototherapy (does not include rare jaundice not treated with phototherapy) | 1 |
|                               | exchange transfusion required  | 2 |
| hypoglycemia                  | none   | 0 |
|                               | transient and easily corrected < 20 mg/day   | 1 |
|                               | requiring persistent high glucose intravenous infusion of over 10% dextrose solution           | 2 |
|                               | severe producing apnea or convulsions  | 3 |
| acidosis                      | pH $\geq$ 7.20   | 0 |
|                               | pH from 7.10 - 7.19  | 1 |
|                               | pH between 7.01 and 7.09   | 2 |
|                               | pH $\leq$ 7.00   | 3 |
| bleeding tendency             | none   | 0 |
|                               | abnormal laboratory tests (increased PT increased PTT thrombocytopenia)                        | 1 |
|                               | bleeding requiring transfusion   | 2 |
|                               | fulminating disseminated intravascular coagulopathy (DIC) or pulmonary hemorrhage              | 3 |

|              |  |   |
|--------------|--|---|
| anemia       | none   | 0 |
|              | anemia requiring "top-up" transfusion                    | 1 |
|              | life threatening anemia requiring transfusion correction | 3 |
| NPO status   | none or <= 12 hours per day                              | 0 |
|              | > 12 hours per day                                       | 1 |
| tracheostomy | none   | 0 |
|              | satisfactory tracheostomy                                | 1 |
|              | problems with tracheostomy                               | 2 |
|              | surgery  | 3 |

where:

- elevated WBC count (for sepsis): at birth > 40 0 per  $\mu\text{L}$ ; at 2 days > 40 0 per  $\mu\text{L}$ ; at 2 weeks > 25 0 per  $\mu\text{L}$ ; at 3 months > 15 0 per  $\mu\text{L}$

daily neonatal morbidity scale = SUM(points for all of the parameters)

cumulative neonatal morbidity scale = SUM(daily neonatal morbidity scales during hospital admission)

Interpretation:

- minimum score: 0
- maximum score: 57

References:

Minde K Whitelaw A et al. Effect of neonatal complications in premature infants on early parent-infant interactions. *Developmental Medicine and Child Neurology*. 1983; 25: 763-777. (Appendices 1 and 2 pages 773-775).