**Diagnostic criteria for common neonatal conditions for use in low-resource settings**

**Abdominal conditions**

**Background**

The reliable diagnosis of common neonatal conditions is critical for identifying disease burdens and providing appropriate care. Diagnostic criteria used internationally may need to be adapted for use in low-resource settings where investigations and other resources are often limited.

Necrotising enterocolitis (NEC) is the most common serious postnatal gastrointestinal disorder affecting newborn infants in high-income settings. Identified risk factors include prematurity and low birth weight, formula feeding, early initiation, speed of feed advancement and treatment with H2-receptor antagonists. Feeding with breast milk is protective. Other conditions such as ileus associated with sepsis and focal intestinal perforation may cause similar clinical signs. There is current controversy regarding the most appropriate clinical, laboratory and imaging criteria for the diagnosis of NEC and also the possibility of NEC sub-types (Gordon *et al.* 2017; Gerphart *et al*. 2018).

**Completing these record sheets**

The NeoNuNet project aims to evaluate the frequency of common neonatal conditions and how they are diagnosed in practice. Diagnoses are made by clinicians according to their usual clinical practice. This record sheet documents the criteria that the clinician has used to make a diagnosis. Not all criteria will be relevant (e.g. equipment or investigation not available) and some information may be missing. All diagnoses are reviewed by senior clinical staff and any changes/corrections made.

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**Methods**

The working group members identified guidelines for the diagnosis of common neonatal conditions (see appendix). The guideline(s) were reviewed by nine senior NeoNuNet clinicians during a workshop in Ibadan, Nigeria and a draft of a diagnostic record sheet (draft 1) for use in the NeoNuNet project was drawn-up to document the diagnostic features / criteria used by clinicians to diagnose common neonatal conditions.

**This information will complement the routine data collected in the study database that will contain the antepartum, intrapartum and immediate postpartum events.**

The diagnostic record sheet will be pilot-tested in network neonatal units and a final record sheet developed (draft 2). These will be used in the data collection phase of the NeoNuNet project and the information collated to describe how diagnoses are made and to estimate the frequency of common neonatal conditions.

**References**

1. WHO, *A pocket book for hospital care of children*. Second ed. 2013, Geneva: WHO.

2. Gephart, S.M., et al., *Changing the paradigm of defining, detecting, and diagnosing NEC: Perspectives on Bell's stages and biomarkers for NEC.* Semin Pediatr Surg, 2018. **27**(1): p. 3-10.

3. McGuire, W., L. Young, and J. Morgan, *Preventing necrotising enterocolitis in very preterm infants: current evidence.* Paediatrics and Child Health, 2015. **25**(6): p. 265–270.

4. Gordon, P.V., et al., *A critical question for NEC researchers: Can we create a consensus definition of NEC that facilitates research progress?* Semin Perinatol, 2017. **41**(1): p. 7-14.

**Record sheet of criteria used by clinicians to diagnose neonatal abdominal conditions**

Complete this sheet for each episode of illness with abdominal signs. A new episode occurs if the infant has been symptom free for **48 hours or more** after any previous episode.

|  |  |  |
| --- | --- | --- |
|  | **Unit code** | **Patient ID** |
| Infant ID: | **XXX** | **X** | **X** | **X** | **X** |
|  |
| ] |  | Infant’s DOB: | **D** | **D** | **/** | **M** | **M** | **/** | **Y** | **Y** |
|  |
| Date of onset of symptoms: | **D** | **D** | **/** | **M** | **M** | **/** | **Y** | **Y** |

**Please complete** **all boxes** below: enter **Y** (present), **N** (absent) or **ND** (not done/not known)**.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Clinical diagnosis*** | Dysmotility/meconium/milk plug: |  | Septic ileus: |  |
|  |
| Focal intestinal perforation (no NEC): |  | NEC: |  | Other: |  |
|  |  |  |  |
| If Other, give details: |

|  |
| --- |
| **Risk factors** |
|  | Weight <2,500g or gestation <37 weeks  |
|  | Perinatal asphyxia  |
|  | Congenital heart disease / PDA |
|  | Treatment with indomethacin |
|  | Polycythaemia |
|  | Blood transfusion |
|  | Umbilical arterial catheter (UAC) |
|  | Umbilical venous catheter (UVC) |
|  | Respiratory Distress Syndrome  |

|  |
| --- |
| **Clinical signs** |
|   | Abdominal distension  |
|  | Abdominal tenderness: possible / definite (please circle) |
|  | Absent bowel sounds |
|  | Ascites: possible / definite (please circle) |
|  | Abdominal/periumbilical redness |
|  | Abdominal wall induration |
|  | Bluish discoloration of abdominal wall  |
|  | Increased pre-feed aspirates |
|  | Stained or blood-stained vomit / pre-feed aspirates |
|  | Blood-stained stools / occult blood (no fissure) |
|  | Non-specific signs (temperature instability, glucose instability, lethargy, apnea/bradycardia, hypotension). If Yes: specify… |
| **Laboratory findings** |
|  | Thrombocytopaenia <100,000/l |
|  | Low or high WBC; immature white cells |
|  | Neutropaenia: <1 x 109/L |
|  | Evidence of disseminated intravascular coagulation (DIC); If Yes, details: |
|  | Metabolic acidosis; If Yes, details: |
| **Imaging – AXR/USS** |
|  | Non-specific bowel dilatation  |
|  | Thickening of bowel wall  |
|  | Fixed, dilated loop (unchanged on >1 radiograph) |
|  | Pneumatosis intestinalis |
|  | Pneumoperitoneum |
|  | Hepatobiliary gas |
|  |  |
| Please add any further information relevant to this event |

*At the onset of symtpoms:*

|  |  |
| --- | --- |
| Was the infant on enteral feeds? (enter Y or N) |  |
| If yes, specify feed type; **please complete** **all boxes**: enter **Y** (present), **N** (absent) or **ND** (not done/not known): |  |
|  |
| Breastmilk: |  | Preterm formula: |  | Infant formula: |  | Other: |  |
|  |  |  |  |
| If Other, give details: |
|  |
| What was the volume of feed (mls/kg/day)? |  |  |  |

|  |  |
| --- | --- |
| Initials of health professional completing form: |  |

**Final diagnosis and outcome**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Outcome date: | **D** | **D** | **/** | **M** | **M** | **/** | **Y** | **Y** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Final diagnosis*** | Dysmotility/meconium/milk plug: |  | Septic ileus: |  |
|  |
| Focal intestinal perforation (no NEC): |  | NEC: |  | Other: |  |
|  |  |  |  |
| If Other, give details: |

*If NEC: how was NEC diagnosed?* **Please complete** **all boxes**: enter **Y** (present), **N** (absent) or **ND** (not done/not known):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Clinically/radiologically: |  | At surgery: |  | Post-mortem: |  |

|  |
| --- |
| ***Outcome for this episode* (**tick one only): |
| Resolved: |  | Persisting morbidity: |  | Died: |  |

|  |
| --- |
| If persisting morbidity, give details: |
| Please add any further information relevant to this event: |

|  |  |
| --- | --- |
| Initials of health professional completing form: |  |

**Appendix 1: Guidelines for the diagnosis of abdominal signs**

1. **Gut signs guideline from ELFIN study (**[**https://www.npeu.ox.ac.uk/elfin/data-collection-forms**](https://www.npeu.ox.ac.uk/elfin/data-collection-forms)**)**



