Topic Expert Group: **Medical care and clinical practice**

Management of suspected early-onset neonatal sepsis (EONS)

Stocker M, Buonocore G, Zimmermann LJI, Hellström-Westas L, Klingenberg C, Kornelisse R, Maier RF, Metsvaht T

Target group
Term and late-preterm infants with suspected infection within the first 72 hours after birth and parents

User group
Healthcare professionals, neonatal units, hospitals, and health services

Statement of standard
Newborn infants with suspected early-onset infection receive prompt diagnosis and effective treatment of sepsis while avoiding overuse of antibiotics.

Rationale
The goal is to reduce morbidity and mortality from early-onset sepsis and adverse effects of overuse of antibiotics. Early diagnosis and treatment of early-onset neonatal sepsis (EONS) are critical in preventing severe and life-threatening complications and mortality. Diagnosis of EONS is difficult due to the often subtle, nonspecific clinical presentation and low predictive values of biomarkers. (1–4) Uncertainty about the presence of neonatal infection may result in unnecessary and prolonged antibiotic treatment. (5,6) Population-based studies in Norway and Switzerland reported a rate of around 2.5% of all term infants started on antibiotic therapy due to suspected EONS, whereas the incidence of culture-proven EONS was between 0.02 and 0.07% (7,8) In other European countries and the United States of America even higher proportions of all term infants are started on antibiotic therapy. (9) Physician's attitudes, such as complacency and fear, have been described as influential factors on antibiotic prescribing. (10)

Antibiotics may have several effects: life-saving for the individual with a severe infection; beneficial for the community hindering spreads of bacteria; problematic for the community regarding development of resistance and for the individual via collateral damage of the microbiome. In early life, antibiotic mediated alteration of the microbiome may have potential consequences for future health. (11–14) Therefore, reduction of unnecessary or prolonged antibiotic therapy is one of the key steps of antimicrobial stewardship to improve future health of the individual and to impede the emergence of multidrug resistant bacteria. (11–16)

Benefits

Short-term benefits
- Reduced mortality and morbidity (17–20)
- Reduced unnecessary and prolonged antibiotic therapy for suspected infection (7–9)
- Reduced separation of mother and infant with less interfering of breastfeeding (consensus)

Long-term benefits
- Reduced development of multidrug resistance (MDR) (12,15)

- Reduced alteration of the infant microbiome, with implication for later health (11–14)

Components of the standard

Component	Grading of evidence	Indicator of meeting the standard
For parents and family		
1. Parents (at the hospital and at home) are informed by healthcare professionals about signs, treatment and consequences of early-onset neonatal infection (see Infant- & family-centred developmental care). (21–25)	A (Low quality) B (High quality)	Patient information sheet
For healthcare professionals		
2. A unit guideline on management for suspected early-onset neonatal sepsis (EONS) is adhered to by all healthcare professionals.	B (High quality)	Guideline
3. Training on management for suspected EONS is attended by all healthcare professionals.	B (High quality)	Training documentation
4. In healthy infants with risk factors for EONS, vital signs are observed and monitored for 24 hours, and infants do not receive antibiotics unless symptomatic. (8,21–26)	A (Moderate quality)	Guideline
5. Always consider to start parenteral antibiotic therapy if newborn infants have clinical signs possibly related to sepsis. (21–25)	A (Moderate quality)	Guideline
6. An aerobic blood culture (minimum 1ml) is drawn before start of antibiotic therapy. (21–25)	A (Moderate quality)	Guideline
7. The need for antibiotic therapy is re-evaluated after 24-36 hours. (21–25,27,28)	A (Moderate quality)	Guideline
8. Antibiotic therapy is streamlined as soon as blood culture results are available. (21–25)	A (Moderate quality)	Guideline
9. ≥3rd generation cephalosporins or carbapenems are not routinely used for empiric therapy. (12,21–25)	A (Moderate quality)	Guideline

For neonatal unit		
10. A unit guideline for suspected EONS is available and regularly updated in conjunction with obstetric guidance on intrapartum prophylaxis. (21,29)	B (High quality)	Guideline
11. Depending on the current rate of neonates started on antibiotics, implementing the sepsis calculator to decrease exposure of antibiotics is considered. (21,30)	A (moderate quality)	Guideline
12. A unit-based antibiotic stewardship programme is established: minimum for use of ≥3rd generation cephalosporins or carbapenems. (31–33)	A (Moderate quality)	Audit report
For hospital		
13. Training on management for suspected EONS is ensured.	B (High quality)	Training documentation
14. Analysis of blood cultures including determination of antibiotic resistance patterns with daily report of results is conducted. (15,16,34,35)	A (High quality)	Audit report
15. Hospital-based antibiotic stewardship programme is established: minimum recording of multidrug resistance (MDR). (31–33)	A (Moderate quality)	Audit report
For health service		
16. A national guideline on management for suspected EONS is available and regularly updated in conjunction with obstetric guidance on intrapartum prophylaxis. (29,34–36)	A (Moderate quality)	Guideline
17. Regional/national surveillance and reports of antibiotic resistance patterns of positive blood cultures are available. (15,16,34,35)	A (Moderate quality)	Audit report

Where to go – further development of care

Further development	**Grading of evidence**
For parents and family	
N/A	
For healthcare professionals	
N/A	

For neonatal unit	
• Develop an algorithm with biomarker guidance for duration of antibiotic therapy. (37–39)	A (Moderate quality)
For hospital	
• Consolidate an antibiotic stewardship programme. (28–30)	A (Moderate quality)
For health service	
N/A	

Getting started

Initial steps
For parents and family
• Parents are verbally informed by healthcare professionals about signs, treatment and consequences of early-onset neonatal infection.
For healthcare professionals
• Attend training on management for suspected early-onset neonatal sepsis (EONS). • Reduce the use of unnecessary antibiotic therapy.
For neonatal unit
• Use published guidelines regarding management for suspected EONS. • Develop and implement a unit guideline on management for suspected EONS in conjunction with obstetric guidance on intrapartum prophylaxis. • Develop information material on signs, treatment and consequences of early-onset neonatal infection for parents.
For hospital
• Support healthcare professionals to participate in training on management for suspected EONS. • Ensure facilities for rapid detection of bloodstream infection. • Start or continue with an antibiotic stewardship programme.
For health service
• Use published guidelines regarding management for suspected EONS. • Develop and implement a national guideline on management for suspected EONS in conjunction with obstetric guidance on intrapartum prophylaxis.

Description

Different national guidelines for the management of suspected EONS are published and may serve as examples. These guidelines are not uniform and differ in some points. (21,24,25,29,40,41) The diversity of the guidelines reflects the diversity of their national healthcare system. It is also a consequence of a different translation of available data to clinical practice such as the approach of maternal risk factors for EONS. Guidelines for the management of EONS have to be adapted to the specific healthcare practices such as screening for maternal colonisation with Group B streptococci, and possibilities for observation of newborn infants at increased risk for EONS. The introduction of the sepsis calculator as algorithm regarding start of antibiotics is mainly dependent on the current rate of newborn infants started on antibiotics. Whereas start of antibiotics due to risk factors alone is not reasonable (compare component 4), risk factors in combination with clinical signs are part of the algorithm of the sepsis calculator.

Source

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