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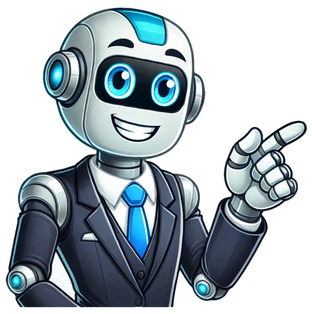

Neonatal sepsis is invasive infection, usually bacterial, occurring during the neonatal period. Signs are multiple, nonspecific, and include diminished spontaneous activity, less vigorous sucking, apnea, bradycardia, temperature instability, respiratory distress, vomiting, diarrhea, abdominal distention, jitteriness, seizures, and jaundice. Diagnosis is based on physical examination and bacterial culture. Treatment is initially with ampicillin plus either gentamicin or cefotaxime, narrowed to organism-specific antibiotics as soon as possible.Neonatal sepsis is invasive infection, usually bacterial, occurring during the neonatal period. Signs are multiple, nonspecific, and include diminished spontaneous activity, less vigorous sucking, apnea, bradycardia, temperature instability, respiratory distress, vomiting, diarrhea, abdominal distention, jitteriness, seizures, and jaundice. Diagnosis is based on physical examination and bacterial culture. Treatment is initially with ampicillin plus either gentamicin or cefotaxime, narrowed to organism-specific antibiotics as soon as possible.Test your KnowledgeTake a Quiz!Many of the symptoms of sepsis in newborns are ones youll see when your baby is sick with another illness. More often than not, your baby wont have sepsis. But if your newborn has more than one of these symptoms or they seem sicker than normal, you should seek medical care right away. Neonatal sepsis symptoms may include:Fever or low temperature.Fast or slow heart rate.Fast breathing or shortness of breath.Vomiting.Diarrhea.Reduced sucking/difficulty feeding.Swollen belly (abdomen).Cold hands and feet.Clammy, pale skin.Yellow skin and whites of their eyes (jaundice).Reduced activity.Seizures.What is the leading cause of neonatal sepsis?Bacterial infections are the most common cause of sepsis in newborns. Bacteria such as E. coli, Listeria and Group B streptococcus (GBS) are common bacteria that can cause infections that lead to sepsis.Viruses, fungi and parasites can also lead to the condition. For instance, the herpes simplex virus (HSV) can cause severe infections in newborns.How do newborns get sepsis?Newborns develop sepsis in different ways based on their age of onset.Early-onset neonatal sepsisNewborns with early-onset neonatal sepsis get an infection from their mother before or during delivery. These infections occur when your baby is exposed to certain types of bacteria. These infections happen more often when:Bacteria such as GBS have colonized in your vagina during pregnancy.Your baby is born prematurely.Your water breaks early (more than 18 hours before your baby is born).Theres an infection in the placenta and amniotic fluid (a condition known as chorioamnionitis).Late-onset neonatal sepsisNewborns with late-onset neonatal sepsis get an infection after delivery. Your baby can acquire an infection from bacteria in their new environment, rather than bacteria from your body. Bacteria can spread to your newborn through medical equipment such as catheters, IVs and tubes. These infections happen more often when your baby:Has a low birth weight.Needs a breathing tube.Needs antibiotics.Has a catheter inserted in a blood vessel or their bladder for a long time.Needs treatment for another condition that prolongs their stay at the hospital. Intended for healthcare professionals Practice Easily Missed? BMJ 2020; 371 doi: (Published 01 October 2020) Cite this as: BMJ 2020;371:m3672 CDC conducts active surveillance for early-onset neonatal sepsis.Early-onset neonatal sepsis is a serious bloodstream infection in infants in the first days of life.Group B Streptococcus (GBS) and Escherichia coli (E. coli) bacteria are leading causes of early-onset neonatal sepsis.GBS early-onset neonatal sepsis has decreased due to GBS-associated primary prevention strategies.The disproportionate burden of E. coli early-onset neonatal sepsis in preterm infants underscores the need for targeted prevention strategies. Neonatal sepsis is a type of invasive disease that occurs when infants develop a bloodstream infection. Invasive disease refers to when bacteria invade parts of the body, like the blood, that are normally free from pathogens. Neonatal sepsis is associated with significant morbidity and mortality. If sepsis develops in the first week of an infant's life, it's referred to as early-onset neonatal sepsis. Often researchers further limit this timeframe to the first 48 or 72 hours of life. Active Bacterial Core surveillance (ABCs) conducts active hospital- and laboratory-based surveillance for invasive bacterial pathogens of public health importance. In 2005, ABCs established surveillance for early-onset neonatal sepsis caused by bacterial infections in infants 0 through 2 days of age. The following ABCs sites currently conduct surveillance for early-onset neonatal sepsis cases: California (CA): Select hospitals in 3 counties in the Bay areaConnecticut (CT): StatewideGeorgia (GA): Select hospitals in an 8-county metro areaMinnesota (MN): StatewideThe surveillance area represents approximately 190,000 live births per year. ABCs calculates disease rates by pathogen and geographic area using the number of observed cases of neonatal sepsis as the numerator. ABCs uses the number of live births in the surveillance area hospitals as the denominator. View LargerDownload Four ABCs sites participate in early-onset neonatal sepsis surveillance. ABCs includes cases if they meet all of the following criteria: Infant 02 days of ageBacterial pathogens isolated from blood or cerebrospinal fluid (CSF)Live birth of an infant at a hospital in the surveillance areaResidence in the surveillance area isn't a requirementThe specific bacterial pathogens include the ABCs and FoodNet pathogens. ABCs excludes cases if any of the following are true: Infant 22 weeks gestationInfections caused by bacterial pathogens deemed contaminantsCulture collected >12 hours after deathBirths outside of a surveillance area hospital (e.g., home birth)Stillbirths ABCs identifies early-onset neonatal sepsis cases through Onsite cooperation of participating surveillance hospital personnelAudits of participating clinical laboratoriesActive reporting to the state surveillance systemSurveillance program staff complete standardized case report forms for each identified case. The forms include information on Demographic characteristicsClinical syndromeIllness outcomePathogen antimicrobial susceptibilityKeep Reading: ABCs Data Collection and Forms GBS and E. coli are leading causes of early-onset neonatal sepsis. Overall incidence of GBS-associated early-onset neonatal sepsis has declined significantly since the introduction of primary prevention strategies in 1996. These strategies include the use of intrapartum antibiotic therapy for women identified to be at increased risk. Continued surveillance is needed to further explore pathogen-specific strategies to reduce the early-onset neonatal sepsis burden even more. View LargerDownload GBS and E. coli account for more than half of all early-onset neonatal sepsis cases. View LargerDownload Incidence of GBS and E. coli early-onset neonatal sepsis has remained relatively stable over the past eighteen years. GBS is the most common cause of early-onset neonatal sepsis in term infants (born between 37 and 42 weeks of pregnancy). In comparison, E. coli is the most common cause in preterm infants (born before 37 weeks of pregnancy). In very-low-birthweight infants who weigh less than 1500 grams at birth, E. coli is a more common cause. The graphs below depict the incidence of GBS and E. coli early-onset neonatal sepsis in preterm, term, and very-low-birthweight infants. In preterm infants, the incidence of E. coli-associated early-onset sepsis is higher than GBS-associated early-onset sepsis in all surveillance years. In term infants, the incidence of GBS-associated early-onset sepsis is higher than E. coli-associated early-onset sepsis. View LargerDownload E. coli causes more early-onset sepsis than GBS among preterm infants. View LargerDownload GBS causes more early-onset sepsis than E. coli among term infants. During most surveillance years, incidence of E. coli early-onset sepsis is higher than GBS early-onset sepsis in very-low-birthweight infants. View LargerDownload Incidence of E. coli early-onset sepsis is higher than GBS early-onset sepsis in infants with very-low-birthweight. Download and print as a PDF (167kB pdf) Newborn babies are at greater risk of infection as their immune system (which normally fights infection) is not fully developed. Most babies are born fit and healthy; however, some may develop an infection before, during, or shortly after birth. When a baby develops an infection in the first 72 hours of life, this is called early onset neonatal sepsis (EONS). EONS is potentially serious and even life-threatening. Information: This leaflet is for parents and guardians of newborn babies at risk of, or being treated for, suspected infection. We know there are many risk factors for developing EONS and we assess whether these risks apply to your baby. Risk factors include: Preterm birth (born more than three weeks early)Signs of infection in the mother during labourThe waters being broken for more than 24 hours before deliverySigns of infection in the newborn baby Breathing difficultiesJaundice (yellow coloured skin and eyes)Abnormal temperatureLow blood sugar levelsJitteriness or floppinessAltered behaviour (excessive crying or being very sleepy)Poor feeding or vomiting Your baby will be monitored to look out for these signs. If there are risk factors or your baby shows signs of an infection then a paediatrician will review your baby. Depending upon the assessment, your baby might just need regular observations or may require a combination of observations and blood tests. If the risk of infection is high, your baby will be started on antibiotics. The antibiotics are given via a small plastic tube into the vein called a cannula, twice daily at 11am and 11pm. The antibiotic used is very safe for newborn babies. There should be no long-term problems. With careful monitoring and timely treatment, it should be possible for your baby to stay with you on the postnatal ward even if antibiotic therapy is needed. In only a few cases of newborn infection will admission to the neonatal unit be needed for extra care. You are always free to ask questions about all aspects of EONS and we welcome discussion about your babys needs and care. Once we are happy there are no signs of infection in your baby and all the blood test results are normal, we will stop the antibiotics. One of the bloods tests we use is called a blood culture (where the laboratory looks to see if bacteria grow from the blood sample). This test takes the longest to process and usually requires 36-48 hours to complete. If there is no evidence of infection and all the blood test results come back as normal, your baby will be discharged and should be treated the same as any other baby. If there are signs of infection, the antibiotics may be continued for five days or longer. During this time your baby will be reviewed regularly and we will update you with any changes to their care. Some of the signs of infection we see (such as fast breathing) may just be part of your baby adapting to life outside the womb. We also know that babies at risk of EONS will not necessarily have infection. However, without tests and a period of observation it is often hard to tell if a baby has an infection or not. It is very important that we identify and treat EONS promptly. If your baby does have an infection, early treatment usually means there will be no long-term consequences. Untreated infections may become much more serious and harder to treat. Delay or no treatment might lead to your baby becoming extremely unwell. We do not want this to happen to your baby so our hospital guideline for EONS is designed to identify problems early on and prevent the onset of serious illness. For all babies who have risks factors for infection, we recommend that you are aware of the signs of infection. This is particularly important if you have been told you had Group B Streptococcus during your pregnancy, as there is a small risk of the baby developing a late infection. Temperature of 38C or above (have a look at the NHS.uk website for further information about fever in children)Rapid breathing or difficulty with breathingNo interest in feeding or persistent vomitingChanges in skin colour: being pale or developing jaundice (yellow skin and eyes)Lethargy: being very tired and not waking for feeds, or being listless or unusually floppyChanges in behaviour such as inconsolable crying You should continue to monitor your baby for any of these signs at home, and if concerned contact your midwife, GP, or go to your local Emergency Department. Thank you for your time and congratulations on the birth of your baby. NHS Choices The NHS choices website contains useful information about many aspects of pregnancy and looking after a new born baby. NICE (National Institute for Health and Care Excellence) NICE gives detailed information about the neonatal early onset infection national guidelines on which our hospital guideline for EONS is based. This information is intended for patients receiving care in Brighton & Hove or Haywards Heath. The information in this leaflet is for guidance purposes only and is in no way intended to replace professional clinical advice by a qualified practitioner. Neonatal sepsis is a life-threatening emergency and any delay in treatment may cause death. Initial signs of neonatal sepsis are slight and nonspecific. Therefore, in suspected sepsis, two or three days empirical antibiotic therapy should begin immediately after cultures have been obtained without awaiting the results. Antibiotics should be reevaluated when the results of the cultures and susceptibility tests are available. If the cultures are negative and the clinical findings are well, antibiotics should be stopped. Because of the nonspecific nature of neonatal sepsis, especially in small preterm infants, physicians continue antibiotics once started. If a baby has pneumonia or what appears to be sepsis, antibiotics should not be stopped, although cultures are negative. The duration of therapy depends on the initial response to the appropriate antibiotics but should be 10 to 14 days in most infants with sepsis and minimal or absent focal infection. In infants who developed sepsis during the first week of life, empirical therapy must cover group B streptococci, Enterobacteriaceae (especially E. coli) and Listeria monocytogenes. Penicillin or ampicillin plus an aminoglycoside is usually effective against all these organisms. Initial empirical antibiotic therapy for infants who developed sepsis beyond the first days of life must cover the organisms associated with early-onset sepsis as well as hospital-acquired pathogens such as staphylococci, enterococci and Pseudomonas aeruginosa. Penicillin or ampicillin and an aminoglycoside combination may also be used in the initial therapy of late-onset sepsis as in cases with early-onset sepsis. In nosocomial infections, netilmicin or amikacin should be preferred. In cases showing increased risk of staphylococcal infection (e.g. presence of vascular catheter) or Pseudomonas infection (e.g. presence of typical skin lesions), antistaphylococcal or anti-Pseudomonas agents may be preferred in the initial empirical therapy. In some centers, third-generation cephalosporins in combinations with penicillin or ampicillin have been used in the initial therapy of early-onset and late-onset neonatal sepsis. Third-generation cephalosporin may also be combined with an aminoglycoside in places where aminoglycoside-resistance to this antibiotic is high. However, third-generation cephalosporins should not be used in the initial therapy of suspected sepsis, because 1) extensive use of cephalosporins for initial therapy of neonatal sepsis may lead to the emergence of drug-resistant microorganisms (this has occurred more rapidly as compared with the aminoglycosides), 2) Antagonistic interactions have been demonstrated when the other beta-lactam antibiotics (e.g. penicillins) were combined with cephalosporins. Infections due to gram-negative bacilli can be treated with the combination of a penicillin-derivative (ampicillin or extended-spectrum penicillins) and an aminoglycoside. Third-generation cephalosporins in combination with an aminoglycoside or an extended-spectrum penicillin have been used in the treatment of sepsis due to these organisms. Piperacillin and azlocillin are the most active of extended-spectrum penicillins against Pseudomonas aeruginosa. Among the third-generation cephalosporins, cefoperazone and ceftazidime possess anti-Pseudomonas activity. Ceftazidime was found to be more active in vitro against Pseudomonas than cefoperazone or piperacillin. New antibiotics for gram-negative bacteria resistant to other agents are carbapenems, aztreonam, quinolones and isepamicin. Enterococci can be treated with a cell wall-active agent (e.g. penicillin, ampicillin, or vancomycin) and an aminoglycoside. Staphylococci are susceptible to penicillinase-resistant penicillins (e.g. oxacillin, nafcillin and methicillin). Resistant strains are uniformly sensitive to vancomycin. A penicillin or vancomycin and an aminoglycoside combination result in a more rapid bacteriocidal effect than is produced by either dr Sepsis is a serious bodywide reaction to infection spread through the blood.Test your KnowledgeTake a Quiz!Many of the symptoms of sepsis in newborns are ones youll see when your baby is sick with another illness. More often than not, your baby wont have sepsis. But if your newborn has more than one of these symptoms or they seem sicker than normal, you should seek medical care right away. Neonatal sepsis symptoms may include:Fever or low temperature.Fast or slow heart rate.Fast breathing or shortness of breath.Vomiting.Diarrhea.Reduced sucking/difficulty feeding.Swollen belly (abdomen).Cold hands and feet.Clammy, pale skin.Yellow skin and whites of their eyes (jaundice).Reduced activity.Seizures.What is the leading cause of neonatal sepsis?Bacterial infections are the most common cause of sepsis in newborns. Bacteria such as E. coli, Listeria and Group B streptococcus (GBS) are common bacteria that can cause infections that lead to sepsis.Viruses, fungi and parasites can also lead to the condition. For instance, the herpes simplex virus (HSV) can cause severe infections in newborns.How do newborns get sepsis?Newborns develop sepsis in different ways based on their age of onset.Early-onset neonatal sepsisNewborns with early-onset neonatal sepsis get an infection from their mother before or during delivery. These infections occur when your baby is exposed to certain types of bacteria. These infections happen more often when:Bacteria such as GBS have colonized in your vagina during pregnancy.Your baby is born prematurely.Your water breaks early (more than 18 hours before your baby is born).Theres an infection in the placenta and amniotic fluid (a condition known as chorioamnionitis).Late-onset neonatal sepsisNewborns with late-onset neonatal sepsis get an infection after delivery. Your baby can acquire an infection from bacteria in their new environment, rather than bacteria from your body. Bacteria can spread to your newborn through medical equipment such as catheters, IVs and tubes. These infections happen more often when your baby:Has a low birth weight.Needs a breathing tube.Needs antibiotics.Has a catheter inserted in a blood vessel or their bladder for a long time.Needs treatment for another condition that prolongs their stay at the hospital. Antibiotic choiceNICE recommends benzylpenicillin and gentamicin as initial antibiotic choicePrescribe gentamicin as a once only medication in the first instance.N.B. A decision should be made by 36h whether to discontinue antibiotics OR to prescribe regular gentamicin dosage.Consider cefotaxime if there is evidence of meningitisDuration of antibioticsFor babies with a strong clinical suspicion of sepsis, or proven sepsis.NB If there is strong evidence, or proof, of Early Onset Sepsis (EOS) the paediatric team should inform their Obstetric colleagues. This may help guide maternal therapy if the mother is also unwell.These babies will be managed initially on the neonatal unit and treated according to the antibiotic guideline. Antibiotics should be commenced within 1h of decision to treatBabies with proven sepsis will generally require a minimum of 7d antibiotics. Longer courses may be required dependent on microbiological results, or in the presence of meningitis see separate guidance for antibiotic therapy.In cases of clinically suspected sepsis, if the blood cultures remain negative, the baby has clinically improved, and the CRP falls to below 10, antibiotic therapy may be discontinued earlier in the course of treatmentFor babies with a red flag OR two or more risk factors or clinical indicators BUT without a strong clinical suspicion of sepsisNB follow this guidance whether or not Intrapartum Prophylaxis has been givenThese babies may be managed on the postnatal wards after their initial investigations.Antibiotics should be prescribed as above. Repeat CRP should be taken 24h later to enable a decision to be made about the need for further treatment within 36h (NICE recommendation)If both CRP tests (Baseline & 24h later) are 10 then Gentamicin should be prescribed on an ongoing basis commencing alongside the 3rd Benzylpenicillin dose. As above, the duration of treatment will be based on the results of blood cultures and/or the persistence of clinical signs.N.B. - If continuing antibiotics for longer than 36 hours despite negative blood cultures, [due to persisting clinical signs] review the baby at least once every 24 hours. Consider at each review whether it is appropriate to stop antibiotic treatment, taking account of:The level of initial clinical suspicion of infection andThe baby's clinical progress and current condition andThe levels and trends of C-reactive protein concentrationThe decision to continue antibiotics in this context should be clearly documented.For babies with a single 'non-red flag' risk factor or clinical indicator and no clinical evidence of sepsis.For these infants we would recommend the following:Withholding antibiotics and observing the baby for 12-24 hours.Parents should be informed about the risk factor which has prompted this recommendation. The parents should be told that the clinical examination has not identified any current signs or symptoms of active infection and that we will continue to monitor these clinical signs throughout the first day of life. (Most babies who develop EOS will become unwell in the first 12-24h).We recommend that all such infants are observed for this period irrespective of whether intrapartum prophylaxis was given or not.A parental leaflet will be provided which will explain this recommendation and to provide information about the signs and symptoms of infection in a baby.If the parents are uncomfortable with the decision not to perform any additional investigations, or treat with antibiotics, then this should be taken into account when planning the baby's care. At the discretion of the medical staff the baby could be managed in the same way as babies with multiple risk factors or clinical concerns as outlined above. Neonatal sepsis refers to an infection involving the bloodstream in infants under 28 days old. It continues to remain a leading cause of morbidity and mortality among infants, especially in middle and lower-income countries. It is divided into early-onset sepsis (EOS) or late-onset sepsis (LOS) based on the age of presentation after birth, with different experts using 72 hours or 7 days as the cutoff. This activity describes the treatment and evaluation of neonatal sepsis and explains the role of the interprofessional team in managing patients with this condition.Objectives:Assess the etiology of early and late-onset neonatal sepsis.Evaluatevarious clinical and laboratory findings associated with neonatal sepsisDifferentiatethe various treatment and management options available for neonatal sepsis.Communicatethe importance of improving care coordination amongst interprofessional team members to improve outcomes for neonates affected by sepsis.Access free multiple choice questions on this topic.Neonatal sepsis is an infection involving the bloodstream in infants under 28 days old. It remains a leading cause of morbidity and mortality among neonates, especially in middle and lower-income countries[1]. Neonatal sepsis is divided into2 groups based on the time of presentation after birth: early-onset sepsis (EOS) and late-onset sepsis (LOS). EOS refers to sepsis in neonates at or before 72 hours of life (some experts use7 days), and LOS is defined as sepsis occurring at or after 72 hours of life[2].EOS is generally caused by the transmission of pathogens from the female genitourinary system to the newborn or the fetus. These pathogens can ascend the vagina, the cervix, and the uterus and can also infect the amniotic fluid. Neonates can also become infected in utero or during delivery as they pass through the vaginal canal. Typical bacterial pathogens for EOS include group B streptococcus (GBS), Escherichia coli, coagulase-negative Staphylococcus, Haemophilus influenza, and Listeria monocytogenes. Maternal factors that increase the risk of neonatal sepsis include chorioamnionitis, GBS colonization, delivery before 37 weeks, and prolonged rupture of membranes greater than 18 hours[3].LOS usually occurs via transmitting pathogens from the surrounding environment after delivery, such as contact from healthcare workers or caregivers. A percentage of LOS may also be caused by a late manifestation of vertically transmitted infection. Infants requiring intravascular catheter insertion or other invasive procedures that disrupt the mucosa are at increased risk for developing LOS.Preterm neonates are at higher risk for sepsis/infection than term neonates. The increased susceptibility for infections seen in preterm neonates is mainly due to :Deficient immune system, mainly due to decreased IgG antibodies and incompetent opsonization and complement activationComprised innate immune system, caused primarily by the immature epithelial barrierThe increased need for invasive devices (vascular access, endotracheal tube, feeding tubes, and urinary tract catheters) due to associated severe illnessesCoagulase-negative staphylococcal species, especially Staphylococcus epidermis, are the leading cause, responsible for over 50% of LOS cases in industrialized countries. However, many other bacterial and viral pathogens can be associated with LOS[3].The epidemiology of neonatal sepsis has been changing with time[4]. The incidence of EOS has decreased since the 1990s due to the introduction of universal screening of GBS in pregnant women and intrapartum antibiotic prophylaxis[5]. However, rates of LOS have remained relatively the same. Escherichia coli now accounts for more cases of EOS[6]. The incidence of EOS with positive blood cultures in the United States is estimated to be 0.77 to 1 per 1,000 live births[7][8]. Due to the nonspecific neonatal presentation for sepsis and the high risk of mortality and morbidity without treatment, many asymptomatic neonates undergo a sepsis workup if risk factors are present and/or clinically indicated. Although approximately 7% to 13% of all neonates are treated for sepsis, only 3% to 8% have positive cultures[3]. Maternal administration of antibiotics and the low blood volume obtained for blood culture could explain the low rate of positive blood cultures. The incidence of sepsis is significantly higher in premature infants, as well as those with very low birth weight (