



# Pediatric Clips

## Evaluation for sepsis in the newborn —

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Pediatric Clips from The Children's Medical Center are quick reviews of common pediatric conditions.

The Children's Medical Center is the region's pediatric referral center for a 20-county area. As the only facility in the region with a full-time commitment to pediatrics, Children's offers a wide range of services in general pediatrics as well as in 35 subspecialty areas for infants, children and teens. We welcome your inquiries about services available — call 937-641-3666 or e-mail marketing@childrensdayton.org.



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### CASE: AN INFANT PRESENTED WITH RISK FACTORS FOR SEPSIS AFTER TWO HOURS OF LIFE

Alec is a 3.45 kg infant born at 39 weeks gestation. The mother's serologies were negative including a cervical culture for group B strep (GBS) at 36 weeks gestation. Labor was induced and membranes were artificially ruptured. Twenty hours later Alec was delivered by cesarean section after failed induction and the presence of deep decelerations on fetal monitoring.

At birth a double nuchal cord was discovered and meconium was found in the amniotic fluid. Alec required bag and mask ventilation for 30 seconds. Apgar scores were 4 and 9 at one minute and five minutes, respectively. He was taken to the nursery and treated as a "normal" infant.

At 2 hours of age a respiratory rate of 80 with mild intercostal retractions and nasal flaring was noted. A spot oximetry check showed 82% oxygen saturation. Alec was placed in a 30% oxygen hood to maintain oxygen saturations more than 90% at rest. At that point the following work-up with results was ordered:

1. CXR: mild haziness bilaterally, prominent perihilar markings, lung volumes fair
2. CBC: WBC of 23,500 with 21 bands, 60 segs and 19 lymphs, and platelets were 170k
3. blood culture x 1

Alec's physical exam was normal except for the noted respiratory signs. Air exchange was

fair. Pulses and perfusion were normal. When CBC results were reported and Alec surpassed 4 hours of age, he was started on antibiotics.

Thirty-six hours later Alec's respiratory rate was 40 and he was weaned to room air. He was breathing comfortably without signs of distress. Two days later the CXR was repeated and found to be normal except for slight perihilar prominence.

A repeat CBC showed WBC of 19,000 with 2 bands, 60 segs and 38 lymphs. Blood culture remained negative at 72 hours, and the antibiotics were discontinued.

### CASE DISCUSSION

This case illustrates possible sepsis, a common problem during the newborn period.

#### RISK FACTORS

Risk factors for sepsis include rupture of membranes at more than 18 hours, positive GBS in mother, maternal UTI, maternal chorioamnionitis and preterm infant. The risk of infection rises from 1% to 3% if one risk factor is present and from 6% to 8% if more than one is present. While these risks do not necessitate a work-up in an otherwise asymptomatic infant, they should be an alert.

#### PRESENTATION

Signs may often be vague in the newborn and present via the respiratory system. The most common signs are tachypnea,

increased work of breathing, oxygen requirement, poor perfusion, lethargy and poor tone. Any abnormality in vital signs or physical examination should cause one to consider sepsis in a newborn. Sepsis in the newborn is virtually indistinguishable from transient tachypnea of the newborn, congenital pneumonia and surfactant deficiency. If abnormal clinical signs develop, the diagnosis should be presumed sepsis until it can be ruled out. Excluding sepsis as a diagnosis in an infant with any abnormal clinical signs can be catastrophic in light of a newborn's reduced capacity to fight infection. Septic newborns are virtually always hypothermic and rarely febrile in the first 72 hours of life. You should not expect a septic newborn to have a fever.

#### WORK-UP

A CXR may show a hazy pattern and a focal infiltrate with certain types of congenital pneumonia. If the CXR is abnormal, it should be repeated in 24 to 48 hours. Improvement suggests fluid or atelectasis in the initial film. If CXR is unchanged, infection is suggested. A CBC should be obtained. A normal WBC for newborns is 10,000 to 30,000. A WBC less than 5,000 is highly suggestive of sepsis. WBC more than 30,000 usually suggests intrauterine stress. If initial CBC is abnormal, as in this clinical case, it should be repeated in 24 to 48 hours. A normal CBC at that time suggests stress from delivery rather than infection. Finally, one blood culture should be sent. It is standard to draw only one in the newborn. A negative

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Continued from the front.

blood culture does not guarantee the absence of sepsis. A urine culture is not indicated because the incidence of UTI in newborns is extremely rare. Further, the risk of obtaining a catheterized specimen far outweighs the benefit. The inclusion of a lumbar puncture as part of a routine work-up is controversial. Meningitis without sepsis is rare but has been reported. My practice is to perform a lumbar puncture if the blood culture becomes positive or if I plan to treat the baby with a full course of antibiotics for presumed sepsis. The incidence of meningitis with sepsis is reported as high as 30%.

## TREATMENT

Suspected sepsis should be treated with antibiotics for a minimum of 48 to 72 hours. If the baby improves clinically and the CBC and CXR are normal at that time, antibiotics can safely be discontinued. If any of the above factors suggest sepsis at 72 hours or if you have a strong "feeling" about this baby, antibiotics should be continued for seven to 10 days. A pleocytosis seen in the CSF necessitates extending treatment to 21 days. Broad-spectrum antibiotic coverage includes ampicillin plus an aminoglycoside (Gentamicin) or Cefotaxime if drug levels may be difficult. If a specific organism is identified by culture, antibiotic choice may change according to sensitivity reports.

This case illustrates the most common clinical situation. This infant clearly was not "normal" after two hours of life. Although few risk factors were present, sepsis must be assumed and the baby should be treated with appropriate antibiotics. The diagnosis in these cases is retrospective. In this case the most likely diagnosis is transient tachypnea of the newborn (retained fetal lung fluid). His depressed presentation at birth and initial abnormal CBC were likely secondary to hypoxemia suffered as a result of the nuchal cord (fetal distress). His initial CXR was likely due to retained fetal lung fluid and dilated lymphatic channels. If Alec had been septic he would not have improved so rapidly and the CBC and CXR would not have been normal at 72 hours.

## FEATURED SPECIALIST



**Don T. Granger, MD,** is a board-certified neonatologist in the newborn intensive care unit (NICU) at The Children's Medical Center of Dayton. Dr. Granger received

his medical degree from East Tennessee State University, James H. Quillen College of Medicine and completed his fellowship in neonatal-perinatal medicine at James Whitcomb Riley

Hospital for Children, Indiana University School of Medicine.

## NEWBORN INTENSIVE CARE UNIT (NICU)

The level III newborn intensive care unit (NICU) at The Children's Medical Center is state-of-the-art, developmentally centered and offers a full range of care for premature and critically ill newborns. Nationally recognized for design and innovation, the NICU was engineered to promote optimal growth and healing. Physicians are board certified in neonatal-perinatal medicine and are assisted by other members of the perinatal team including a neonatal nurse practitioner, nutritionist, social worker, speech therapist, OT/PT,

clinical pharmacist and lactation consultant.

## TRANSPORT TEAM

A newborn transport team is available 24 hours a day to attend high-risk deliveries and stabilize sick newborns after delivery. If needed, the team can transport infants to an intensive care setting. To contact the newborn transport team, call 937-223-2229 (BABY).

## CONTACT INFORMATION

Call newborn medicine at 937-641-3414. Consultation and assessment of newborns hospitalized at other facilities is available 24 hours a day by calling the neonatologist on call at 937-641-3040.



For further information about The Children's Medical Center or its specialists contact us at 937-641-3666 or [marketing@childrensdayton.org](mailto:marketing@childrensdayton.org).



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