

Danger signs in a newborn

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You are aware that mortality among sick neonates is very high and facilities for appropriate care of very sick neonates are less. It may take a long time for a sick neonate to reach a hospital. It is therefore important that they are identified early and referred for appropriate treatment.

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Early identification of a sick newborn however, has some problems. The clinical features are nonspecific e.g. whether the illness is of infective or metabolic origin, the signs do not help us in differentiating the cause (etiology). Moreover, the distinction between variation of normal behavior and early signs of illness becomes more difficult in low birth weight and preterm infants.

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Lethargy/poor feeding

We shall briefly review some of the important "danger signs" which may suggest that the neonate is sick and needs early referral to an appropriate care centre.

In a full-term baby, lethargy and poor sucking, especially in an infant who was feeding well earlier, are very important and sensitive indicators of neonatal illness. Most of the mothers shall be able to give this history and most of the times mothers are rightly concerned. In a preterm baby, however, poor feeding and/or lethargy may at times be normal. Such infants must be carefully assessed for referral, as even these babies often need better health care facilities (Special Care Units) available in some hospitals only.

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Prolonged Capillary Refill Time (CRT)

Perfusion signifies adequacy of circulation. Poor perfusion indicates hypotension. A simple and reliable clinical indicator of perfusion is the Capillary Refill Time (CRT). It should be noted that CRT may be prolonged due to hypothermia also because of peripheral vasoconstriction. Hence, this source of error should be excluded. It is measured as follows:

1. The skin over the mid-sternum is pressed with ball of the thumb for 5 seconds so that it blanches.
2. The thumb is then lifted and time taken for refilling of the capillaries and return to original skin color is noted.
3. Normal CRT is ≤ 3 seconds. It means that it take 3 seconds or less for the blanched skin to regain its pink color. If it takes longer than 3 seconds for blanching to reverse, it indicates poor perfusion. Use 10 ml/kg normal saline bolus over 5 to 10 minutes to correct it. If CRT is still prolonged, a second bolus may be needed before using vasopressors.

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Respiratory problems

Breathing difficulties indicate serious illness in the newborn. An increased respiratory rate (more than 60 per minute when counted for at least one minute) and chest retractions indicate a serious problem. It could be due to pneumonia, hyaline membrane disease, heart failure or malformation.

Since neonates, especially preterm babies, have a very soft chest wall and their breathing is mainly diaphragmatic, one need to count the rise of abdomen in a minute for counting respiration (inspiration). It is not unusual to find mild indrawing of the lower part of chest in a preterm without respiratory distress. The normal breathing pattern in the newborn is characterised by brief periods of cessation of breathing called periodic breathing. However, cessation of breathing (apnea) when accompanied by cyanosis and/or fall in heart rate (bradycardia) always signifies serious

illness. Respond immediately to an apnea because each apneic episode is potentially fatal and can result in irreversible brain damage. The common causes of apnea in a neonate can be (any one or in combination): hypo -or hyperthermia, hypoglycemia, septicemia, anemia, meningitis, intracranial hemorrhage or apnea of prematurity. Stimulate the baby for breathing by gently stroking the foot (baby may "forget to breathe"). Position the baby with slight head extension by placing a rolled towel/sheet under the shoulder and suck out secretions briefly from the throat. If stimulation fails, give bag and mask ventilation with oxygen connected. Treat cause of apnea. Loading dose of aminophylline 5 mg/kg followed by 2 mg/kg/8 hourly is known to help in apnea of prematurity. Apnea due to metabolic or infective cause may not respond to aminophylline therapy and shall need specific therapy.

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Thermal imbalances

Temperature instability is a very important danger sign in neonates. Hypothermia (temperature below 36.5 degrees centigrade) is a common sign in sick neonates especially in low birth weight babies. Axillary temperature recorded for at least three minutes will indicate the extent of hypothermia in a baby who is "cold to touch". Such infant with other signs of illness should be reassessed after warming. If the baby does not improve his activity and cry, it indicates a more serious underlying disorder. Unlike adults, neonates often manifest hypothermia as a sign of infection. Fever (temperature above 37.5 degrees centigrade) is a sign of infection usually in term neonates. However, in all febrile neonates a diligent search for a possible infective focus must be made.

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Failure to pass meconium and urine

Some babies pass meconium in utero or soon after birth. All healthy babies must pass meconium within 24 hours of age. Non passage of meconium by 24 hours of age is an indication for doing appropriate investigations to exclude intestinal obstruction. Pass a lubricated rectal thermometer; few babies may pass meconium or meconium plug after this stimulation.

Failure to do so and early evidence of abdominal distension merit radiological investigations to rule out intestinal obstruction. Such babies need early transportation to an appropriate centre.

After birth, most babies pass urine by 48 hours of age. Infants with delayed passage of urine should be investigated for congenital conditions like obstructive uropathy and agenesis of kidneys. Normal neonates pass urine 6 to 10 times in a day if feeding is adequate. In a baby with delayed passage of urine, first ensure adequate feeding. In a male baby palpate for bladder and kidneys. Their enlargement suggests obstructive uropathy which will need radiological investigations and possible surgery in an appropriate centre.

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Vomiting

Ingestion of meconium stained amniotic fluid may lead to vomiting on the first day in many neonates. If it is persistent, stomach wash with saline is performed. Regurgitation or vomiting soon after feeds is often due to faulty feeding technique or aerophagy. In case of persistent, projectile or bile stained vomiting in association with failure to pass meconium during the first 24 hours and or abdominal distension, the baby should be investigated for intestinal obstruction. Such neonates must reach the hospital before becoming dehydrated or worse due to electrolyte imbalance.

Vomiting may be a symptom of raised intracranial tension due to intraventricular hemorrhage (IVH), birth asphyxia, meningitis, systemic illness, cardiac failure or metabolic disorders (CAH, Galactosemia). Hypertrophic pyloric stenosis usually presents after two weeks of age. In hiatus hernia or esophageal reflux, vomiting usually occurs as soon as the baby is put on a cot in horizontal position.

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Diarrhea

Change in established bowel pattern towards greater frequency and looseness should be taken seriously. Many infants pass stools while being fed but otherwise remain alright and keep on gaining weight. Breast fed babies pass more frequent stools than formula fed babies. Maternal ingestion of drugs (ampicillin, laxatives) and certain fruits like mango may result in loose stool in breast fed babies; it does not need any specific treatment. In infective diarrhea in a newborn, baby needs treatment with systemic antibiotics in addition to replacement of fluid losses and electrolytes. Diarrhoea may also occur due to thyrotoxicosis, metabolic conditions, maternal drug addiction or at times due to overfeeding.

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Cyanosis

Cyanosis is bluish discoloration of skin and mucosa. Peripheral cyanosis or acrocyanosis is seen in the extremities only. It may be normal in babies in the first few days of life, especially when they are cold. Central cyanosis is a very important danger sign. It is seen all over especially on lips and tongue. Central cyanosis indicates underlying cardiac or respiratory disease and therefore always requires prompt attention and appropriate referral. Neonates may not manifest cyanosis till very late due to the presence of fetal hemoglobin. So cyanosis though important is a late sign of neonatal sickness.

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Pathological jaundice

Jaundice in the newborn may be physiological, but when it appears on the first day of life or the skin staining is up to palms and soles or it persists beyond 2 weeks of life, needs investigation and appropriate treatment. Hyperbilirubinemia in the first week could lead to kernicterus and severe disabilities. *Refer to topic on neonatal jaundice.*

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Tracheo-esophageal fistula

A newborn baby with excessive drooling, frothy saliva and choking and cyanosis during first feed should alert staff to rule out atresia of the upper digestive tract. Overflow of milk and saliva from esophagus and regurgitation of secretions through the fistulous tract (if present) into the lungs results in pneumonia. Failure to pass a red rubber catheter 8 to 10 cm from mouth and an x-ray help in making the diagnosis.

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Congenital heart disease

Cardiac disease should be suspected when there is significant distress with cyanosis, tachycardia, murmur and hepatomegaly. Tachypnea may be marked but chest retractions are minimal. If the baby presents in shock and distress one should suspect cardiac disease.

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Excessive weight loss

If birth weight or previous weight records are available, weight loss pattern is an objective indicator of not being well in a newborn. Weight loss more than 10 percent over birth weight in a term baby and more than 15 percent in preterm and any acute loss of more than 5 percent should be viewed with concern and one should attempt to seek the cause as early as possible.

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Summary

In conclusion, the important danger signs are: lethargy, breathing problems, temperature instability, failure to pass meconium and/or urine, vomiting, diarrhea, cyanosis, jaundice, abdominal distension, convulsions, bleeding and excessive loss of weight.

It is evident that all these signs are not etiology specific but indicate a sick newborn and the need for early and safe referral for appropriate care.