Management of pneumonia in the child aged 0 to 8 weeks

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SUMMARY

The group of children with the highest mortality from pneumonia is the group aged 8 weeks and younger. This group of infants is more likely to present with non-specific signs of disease, and the pneumonia is caused by a wider spectrum of organisms. For these reasons, infants aged ≤8 weeks have to be carefully assessed, taking into account the characteristics peculiar to this age. Due to the seriousness of the pneumonia, they are only classified into three categories: very severe pneumonia, severe pneumonia and cough or cold. All infants aged ≤8 weeks diagnosed with severe or very severe pneumonia must be hospitalised, as they require parenteral antibiotics for at least 8 days and need careful monitoring. The monitoring needs to be adapted, as they are more likely to have problems with body temperature and serum glucose control. Careful plans have to be formulated to ensure that these infants recover fully and are integrated into the well baby clinics. In the triage of sick children, it is those aged ≤8 weeks who should receive the most urgent attention.

KEY WORDS: pneumonia; classification of severity; inpatient treatment; complicating conditions; monitoring; discharge

THIS ARTICLE discusses the management of pneumonia in infants aged 8 weeks and younger (the young infant).1,2 Young infants must be managed with greater care, as they have the highest mortality from pneumonia and other serious infections. The time from onset of infection to death can be very short. The symptoms caused by pneumonia can be very non-specific and often overlap with symptoms caused by other serious infections. A greater proportion of infections are caused by gram-negative organisms that require different antibiotic regimens. For these reasons, young infants have special characteristics that must be considered when classifying and managing their illness.

The assessment of the young infant is somewhat different from that of an older child. In a young infant there are more danger signs, which include 'stopped feeding well', 'fever or low body temperature', 'wheezing' and 'apnoea'. When assessing a young infant, care must be taken with chest indrawing: as young infants normally have a degree of indrawing, severe chest indrawing needs to be present for them to be classified as having severe pneumonia. Mild chest indrawing is normal in young infants because their chest walls are soft. In the young infant, fast breathing is defined as breathing ≥60 times per minute.

There are three categories of disease:

1 Very severe pneumonia/disease
2 Severe pneumonia
3 Cough or cold

There is no category of 'non-severe' pneumonia for this age group.

* The standard case management of pneumonia described in this article contains modified/adapted text from references 1 and 2.

Previous articles in this series


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IN-PATIENT CARE OF PNEUMONIA

Severe/Very severe pneumonial/disease
Admit immediately, as all cases of severe pneumonia and very severe pneumonia/disease require treatment to be given in hospital.

Diagnosis
Young infants have special characteristics that must be considered when classifying their illness. They can become sick and die very quickly, are much less likely to cough with pneumonia and frequently have only vague signs such as poor feeding, fever and low body temperature. They can also present with life-threatening symptoms such as apnoea. Furthermore, mild chest indrawing is normal in young infants because their chest wall is more compliant than in older children.

Specific signs for very severe pneumonia/disease are:
- fast or irregular breathing ≥60 breaths/min
  AND/OR
- severe chest indrawing
  PLUS
any one of the following danger signs:
- cyanosis
- apnoeic episodes
- nasal flaring
- grunting
- wheezing.

A young infant with any of these danger signs is classified as having very severe pneumonia/disease.

Serious bacterial infection in young infants includes pneumonia, sepsis and meningitis. They are difficult to tell apart, as they share common symptoms and signs. Treatment for each of these conditions needs to be started immediately, even before a diagnosis of the specific cause is known. Some newborns with a serious bacterial infection can present with severe jaundice. In some newborns, umbilical or skin infections may be present and serve as the source of the severe infection.

The symptoms of serious bacterial infection are often non-specific. There may be a history of being abnormally sleepy or difficult to wake, stopping feeding well, vomiting or convulsions.

General signs, on examination, are:
- fever (axillary temperature >37.5°C)
- hyperthermia (<35.5°C; <36°C in the newborn)
- pallor or jaundice
- distended abdomen
- large spleen and/or liver
- reduced level of consciousness.

Specific signs for severe pneumonia are:
- fast or irregular breathing ≥60 breaths/min
  AND/OR
- severe chest indrawing with no danger sign.

Treatment
Very severe pneumonia/disease, severe pneumonia and generalised infection (sepsis): Any young infant classified as having any of these conditions must be admitted immediately to hospital.

The treatment consists of gentamicin (7.5 mg/kg IM once daily) plus benzylpenicillin (50 000 units/kg IM) every 6–12 h depending on age. Treatment with benzylpenicillin IM should be given for at least 4 days. Once the infant’s condition has substantially improved, and this improvement sustained, oral amoxicillin (15 mg/kg every 8 h) can be given in place of benzylpenicillin plus gentamicin (7.5 mg/kg IM once daily). The total course of treatment is at least 8 days.

Failure to improve
- If there is no response to treatment in the first 48 h, or if the child’s condition gets worse, add chloramphenicol (25 mg/kg IM every 8–12 h, depending on age). However, chloramphenicol should not be used in premature infants (born before 37 weeks of gestation), and should be avoided in infants in the first week of life. The preferred alternative in premature infants and infants in the first week of life is cefotaxime or ceftriaxone.
- If the response to treatment is poor after 48 h, the patient should be referred to a specialist or experienced clinician, and change to cefotaxime (50 mg/kg IM or IV every 6 h) plus ampicillin (50 mg/kg IM every 6 h).

Oxygen therapy: Give oxygen treatment to young infants with any of the following:
- central cyanosis
- grunting with every breath
- difficulty in feeding due to respiratory distress—severe lower chest wall indrawing, head nodding (i.e., a nodding movement of the head, synchronous with respiration and indicating severe respiratory distress).

Nasal prongs are the preferred method for delivery of oxygen to this age group, with a flow rate of 0.5 l/min. Thick secretions from the throat and nose may be cleared by intermittent suction, if they are troublesome and the young infant is too weak to clear them. Oxygen should be stopped when the infant’s general condition improves and the above signs are no longer present.

Complicating conditions
1 Hypoglycaemia: Hypoglycaemia is detected using a blood dextrostix test. If the blood glucose is <2.5 mmol/l (<45 mg/dl), treat with 10 ml/kg of 10% glucose given by nasogastric tube, and prevent recurrences by frequent feeding. Continue feeding the young infant to provide calories and fluid. Breastfeeding should be resumed as soon as possible. If the in-
fant is too weak to breastfeed, give breast milk by nasogastric tube, spoon or cup. If feeding is not possible, monitor the blood glucose 6 hourly and, if necessary, set up an IV line to administer glucose.

2 Hypothermia: As hypothermia can be a sign of a cold environment or of serious systemic infection, assess every hypothermic newborn for infection.

A low-reading thermometer should be used. If the rectal (core body) temperature is <32°C, the hypothermia is severe; between 32°C and 35.9°C, the hypothermia is moderate.

It is vital to rewar a young infant with hypothermia as soon as possible. In cases of severe hypothermia, rapid rewarmin can be achieved by using a thermosotically-controlled, heated mattress set at 37–38°C or an air-heated incubator set at 35–36°C. Make sure that the incubator or the mattress is reliable, well maintained, and that staff have experience in using them. The room temperature must be at least 25°C.

This equipment is also good for rewarmin infants with moderate hypothermia. If it is not available, use a warm room (at least 34°C), a warm cot or skin-to-skin contact with the mother. The following points should be observed:

- Before rewarmin, the child’s cold clothing should be removed and replaced with prewarmed clothes and a bonnet.
- A cot should be warmed to 36–37°C. If it is heated with a hot water bottle, this must be removed before the baby is put in the cot.
- For skin-to-skin rewarmin, place the infant between the mother’s breasts (‘kangaroo mother care’). The child should be dressed in a shirt open at the front, a nappy, bonnet and socks, and covered with a blanket. The infant should be kept with the mother until the temperature becomes normal.
- Even if a warm room (at least 34–35°C) is used for rewarmin, the infant should still be dressed and well covered, and wear a bonnet.
- During an examination or investigation, particular attention should be paid to avoid chilling the infant.

Monitoring

All young infants with very severe pneumonia should be checked by a nurse at least every 3 h and by a doctor at least twice a day. Those with severe pneumonia should be checked by a nurse at least every 6 h and by a doctor at least once a day. A record should be kept of the respiratory rate, temperature, level of consciousness and ability to drink or breastfeed. Within 2 days, if there is no complication, there should be signs of improvement recorded:

- reduction in respiratory rate
- resolution of lower chest indrawing
- reduction of fever
- improved appetite and fluid intake.

The nurse should check the young infant’s temperature and, where appropriate, the temperature of the external heating device at least every hour. Once the baby’s temperature reaches 34°C, the rewarmin process should be slowed to avoid overheating.

Discharge and follow-up

Many children die shortly after discharge from hospital. It is therefore vital to give careful attention to planning the child’s discharge and follow-up to prevent this from occurring.

The discharge process for all children should include:

- discharge from hospital after a child commences oral antibiotic treatment
- counselling mothers on the treatment and nutritional needs of the child at home
- making sure that the child’s immunisation status and record card are up-to-date
- giving written feedback to the health worker responsible for follow-up care and review
- informing the mother on when to return to the hospital for follow-up and the importance of returning. Giving written/pictorial instructions to the mother on symptoms and signs that indicate the need to return immediately
- linking with appropriate organisations when special equipment or support is required (e.g., for children with human immunodeficiency virus/acquired immune-deficiency syndrome [HIV/AIDS] and malnutrition).

Timing of discharge from hospital

Seriously ill children must stay in hospital as long as they must be closely monitored and when the treatment they require is available only in a hospital (e.g., oxygen therapy or parenteral antibiotics). Early discharge may interrupt these treatments and run the risk of the child relapsing or of dying.

The young infant can be considered ready for discharge after the clinical condition has substantially improved (afebrile, alert, drinking or breastfeeding and sleeping normally), the improvement has been sustained and treatment by mouth has been given for at least 24 h.

A number of factors need be taken into account when deciding on discharge, and should be considered on an individual basis, such as:

- What is the family’s home situation like, how much support exists to help care for the child?
- What is the likelihood that the treatment course will be completed at home—what is the staff’s opinion regarding this?
- What is the likelihood that the family will return immediately to the hospital if the child’s condition should worsen—what is the staff’s judgment of this?
Communicating with caregiver using the Mother’s Card

A simple pictorial card has been developed by the World Health Organization which can easily be adapted to meet different ethnic and language groups. The card should be given to the mother when her child is discharged from hospital. It is used to remind the mother how to care for her child at home, when to return for follow-up care, and the signs indicating the need to return immediately to hospital.

Providing follow-up care

A child who is discharged after in-patient hospital treatment for severe or very severe pneumonia to complete the course of oral antibiotics at home needs to return for follow-up care for the following reasons:

- to check that treatment at home was either continuing or completed (course of antibiotics)
- to check that the child has fully recovered (if this had not already happened at the time of discharge), i.e., respiratory rate, temperature and drinking/eating/feeding pattern, for the particular child, have returned to normal
- to check for delayed (or hidden) complications that may occur after the child has recovered, such as chronic cough.

If the child lives far from the hospital and transportation is difficult, arrangements should be made for the mother to take the child to the nearest health centre for a follow-up visit. A discharge/follow-up form should be given to the mother to present to the health worker—this can then be completed and returned to the hospital. This fulfills two functions, in that it:

- informs the local health centre of the patient’s hospitalisation, especially if they had originally transferred them, and
- allows the hospital to receive the information so as to complete their discharge/outcome records on receipt of the follow-up visit information via the returned discharge/follow-up form.

OUT-PATIENT CARE

Cough or cold

A young infant who is breathing less than 60 times/min, and has no severe chest indrawing or danger signs, is classified as having no pneumonia: cough or cold.

A careful examination should be completed to exclude otitis media and other infections. The mother should be instructed in providing care for the child in the home. In addition, she should be carefully instructed to watch for the development of signs of fast or difficult breathing, and if they appear, to return with the child immediately. Prescribing antibiotics for infants in this category does not prevent pneumonia or serious infection but induces resistant organisms that make the treatment of subsequent infections more complex, as drug resistance then has to be considered.

NB: Under these circumstances, no antibiotics should be given.

CONCLUSION

The assessment and management of infants aged ≤8 weeks must be done with great urgency to prevent these infants from dying from pneumonia and other serious infections. In this age group, special attention must be given to non-specific signs of disease and the antibiotics adjusted to the wider spectrum of organisms causing disease. As these infants have fewer reserves in maintaining body temperature and glucose homeostasis, monitoring and feeding requirements need adaptation. In the triage of sick infants and children, it is the group of infants ≤8 weeks who require the highest priority.

References


RÉSUMÉ

Le groupe d’enfants dont la mortalité par pneumonie est la plus élevée est celui âgé de 8 semaines ou moins. Ce groupe d’enfants est plus susceptible de se présenter avec des signes non-spéfiques de maladie, et la pneumonie est causée par un spectre plus large d’organismes. Pour ces raisons, les nourrissons âgés de ≤8 semaines doivent être évalués avec soin en prenant en considération les caractéristiques particulières à ce groupe d’âge. Vu la gravité des pneumonies, elles sont classées seulement en trois catégories : pneumonie très grave, pneumonie grave et toux ou rhume. Tous les nourrissons âgés de ≤8 semaines, diagnostiqués comme pneumonie grave ou très grave doivent être hospitalisés car ils ont besoin d’antibiotiques par voie parentérale pendant au moins 8 jours et nécessitent un suivi soigneux. Le suivi doit être adapté, car ils sont plus susceptibles de rencontrer des problèmes de température corporelle et de contrôle du glucose sère. Des plans soigneurs doivent être élaborés pour s’assurer que ces nourrissons guérissent complètement et sont intégrés dans les polycliniques pour enfants bien portants. Dans le triage des enfants malades, c’est celui des enfants âgés de ≤8 semaines qui devrait bénéficier de l’attention la plus urgente.
El grupo de niños con la más alta mortalidad por neumonía es aquel de los lactantes hasta las 8 semanas de edad. En este grupo la enfermedad se manifiesta con mayor frecuencia con signos insespecíficos y la causa de la neumonía abarca un espectro más amplio de microorganismos. Por estas razones, es importante evaluar muy cuidadosamente los lactantes de ≤8 semanas, teniendo en cuenta las particularidades propias de la edad. Dada la gravedad de la neumonía, se definen sólo tres categorías: neumonía muy grave, neumonía grave y tos o resfriado. Todos los lactantes ≤8 semanas de edad con diagnóstico de neumonía grave o muy grave deben hospitalizarse, pues requieren la administración de antibióticos por vía parenteral como mínimo durante 8 días y una vigilancia estrecha. La vigilancia debe adaptarse, pues estos niños tienen mayor riesgo de presentar problemas de regulación de la temperatura corporal y de la glucemia. Deben formularse protocolos cuidadosos para conseguir la recuperación completa de estos pacientes y su integración a la consulta del niño sano. En el examen selectivo de los niños enfermos, los lactantes ≤8 semanas de edad precisan la atención más urgente.