



A mother in Nepal lies with her baby. © 2008 Suaahara/JHUCCP, Courtesy of Photoshare

Antibiotic resistant sepsis in newborns and infants: a major threat to achieving MDG-4 targets

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Community-acquired neonatal and infant sepsis in developing countries

Sepsis (severe infection) is the third most common cause of death in newborns, with around 500,000 newborn deaths annually. Infants under one year old also have high risk of sepsis. Developing countries have the highest rates of severe bacterial infection in young children and limited capacity to diagnose the cause of the infection. Children with sepsis but no signs of specific infection, such as pneumonia or meningitis, are treated with antibiotics that cover the most likely causes of infection.

WHO's *Pocket Book of Hospital Care for Children* recommends the following antibiotics for young children:

	First line	Second line
Young infants (0-2 months)	Ampicillin (or penicillin) and gentamicin.	Third-generation cephalosporins.
Older infants (Over 2 months)	Benzylpenicillin and chloramphenicol.	If response is poor, change to ampicillin and gentamicin after 48 hours. Third-generation cephalosporins.

Some bacteria have developed resistance to antibiotics that are commonly used to treat them. We reviewed bacterial resistance to the antibiotics recommended by WHO for treatment of newborns and young infants with community-acquired sepsis where no clear cause of infection was clinically identified.¹

Sepsis due to antibiotic resistant bacteria is an emerging and substantial problem, and the currently recommended first-line or second-line antibiotics do not provide adequate cover.

- In newborns with sepsis, tests showed that bacteria were resistant or have reduced susceptibility to combination of penicillin and gentamicin and to third-generation cephalosporins in more than 40% of cases.
- In infants 1-12 months with sepsis, tests showed that bacteria found in blood samples were resistant or had reduced susceptibility to the combination of penicillin and gentamicin and to third-generation cephalosporins in more than 35% of cases.

With the reduction in price and more widespread availability in many developing countries, third-generation cephalosporins are now used as first-line treatment for severe sepsis. However, third-generation cephalosporins are not more effective against common bloodstream bacterial pathogens than the combination of penicillin and gentamicin, and overuse may be increasing antibiotic resistance in some bacteria.



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newborns and young children, based on the principle of "first do no harm".

Recommendations

- Appropriate second-line treatment for when bacteria are isolated or suspected needs to be explored and clinical indications for timely second-line therapy need to be developed. Recommendations for the use of antibiotics must consider efficacy and minimise the development of further resistance.
- Better surveillance of antibiotic-resistant bacteria will need improved bacteriology services in provincial and district hospitals and carefully planned research collaboration. Local surveillance data can also be used to guide local antibiotic choices.
- Higher-generation antibiotics could be made available in resource-limited developing countries but there is a need to restrict their use and ensure it is based on evidence.
- To minimise unnecessary use and overuse of antibiotics, governments could:
 - Restrict over-the-counter or market sales of antibiotics.
 - Restrict incentives that pharmaceutical companies can provide health care workers and facilities.
 - Introduce regulations on the use of antibiotics in feed for commercial animal production.
- To minimise unnecessary use and overuse of antibiotics, hospitals could:
 - Restrict the availability and use of higher generation broad-spectrum antibiotics.
 - Convene advisory committees for antibiotic stewardship.
 - Introduce procedures to stop antibiotics if bacteria are not found in blood tests.
- Essential steps to preventing neonatal sepsis:
 - Good hand hygiene
 - Improve the quality and use of maternal and newborn health services. For example: clean deliveries, immediate and thorough drying, skin-to-skin contact, full breast-feeding, avoiding hypoglycaemia and hypothermia, and exposure to nosocomial pathogens. Adopt the "First Embrace" promoted by WHO.
 - Place greater emphasis on non-invasive medical care for sick patients. For example, limit the use of intravenous fluid, encourage enteral feeding with breast milk, and minimise invasive respiratory support. Use high flow oxygen CPAP (Continuous positive airway pressure) rather than mechanical ventilation.
- National and hospital committees are needed to advise and co-ordinate these interventions.

References

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