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Neonatal listeriosis in the UK 2004–2014

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Summary *Objective:* To define the clinical features and outcomes of neonatal listeriosis, and identify the maternal risk factors to seek scope for improvement.
Methods: Neonatal listeriosis was identified prospectively from a United Kingdom neonatal infection surveillance network (neonIN) between 2004 and 2014. The participating neonatal units completed a study-specific proforma.
Results: The incidence of neonatal listeriosis was 3.4 per 100,000 live births. Of the 21 cases identified, 19 were confirmed with a median gestational age of 33 weeks and a median birth weight of 1960 g. The majority had clinical features (95%, 18/19), presented within the first 24 h (95%, 18/19), and received penicillin empirically (94%, 18/19). The neonatal case-fatality rate was 21% (24% if probable cases were included). A proportion of mothers were investigated (60%, 12/18) and diagnosed with listeriosis (58%, 7/12); 32% (6/19) were treated with antibiotics but only 33% (6/12) included penicillin.
Discussion: Despite its rarity and the prompt and appropriate use of antibiotics neonatal listeriosis has a high case-fatality rate. There is room for improvement in the adherence to the empiric antibiotic choice for puerperal sepsis, according to the national guidelines as this, would target listeriosis. Strategies should be in place to prevent pregnancy-associated listeriosis in higher risk population.

Introduction

Listeria monocytogenes is a Gram-positive bacillus. *L. monocytogenes* causes listeriosis, an infection predominantly transmitted through the consumption of contaminated food. Recent estimates suggest that listeriosis is the most common cause of food-related deaths in the UK (130 deaths in 2005).[1] The incidence of listeriosis in pregnancy is 12 per 100,000, compared with a rate of 0.7 per 100,000 in the general population.[14]

For an antibiotic to be effective against *L. monocytogenes*, the antibiotic must penetrate into the host cell, maintain a high concentration and bind to the penicillin-binding protein (PBP), which causes cell death. Penicillin, amoxicillin and ampicillin have been used most extensively in the treatment of listeriosis as these drugs block several PBPs and do penetrate intracellularly. Some in-vitro studies also suggest a synergistic effect when gentamycin is added to the treatment regimen.[9] Studies in Denmark and Northern Italy found *L. monocytogenes* human isolates to be susceptible to ampicillin, amoxicillin, benzylpenicillin, meropenem, erythromycin and gentamicin.[12,13] *L. monocytogenes* is intrinsically resistant to broad-spectrum cephalosporin antibiotics, which are commonly used in treatment of bacterial infections.[6]

Neonatal listeriosis occurs via congenital infection. In the UK, it is the third most common cause of early-onset neonatal infection[3] and the fourth most common cause of early-onset neonatal meningitis.[7] It manifests commonly in the first 24—72 h of life (62% of cases).[3] Early-onset neonatal listeriosis can manifest as bacteraemia, meningitis and less commonly pneumonia. Late-onset neonatal listeriosis is most commonly associated with meningitis.[2]

Neonatal listeriosis is associated with high case fatality rates. In the UK between 1967 and 1985, 248 out of 722 cases of human listeriosis (34%) were associated with pregnancy of which 42 cases resulted in intrauterine deaths (19%) and 47 in neonatal deaths (35%), with an overall case fatality rate of 50%.[4]

This study aims to define the clinical features, risk factors and outcomes of neonatal listeriosis in a UK neonatal infection network over a period of 11 years.

Materials and methods

Cases of neonatal listeriosis were prospectively identified between January 2004 and December 2014 through neonIN, a neonatal infection surveillance network (www.neonin.org.uk). The contributing centres voluntarily collect data on culture-positive neonatal infections onto the web-based research database, which is also crosschecked with laboratory records to ensure validity and quality.

All neonIN centres in the UK contributing data within the study period were contacted and requested to complete a study-specific proforma for additional information (maternal and neonatal demographics, risk factors, clinical