

Case Report

Early onset Neonatal Listeriosis-A life threatening neonatal illness

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Introduction

Listeria monocytogenes is a short Gram-positive bacillus. Listeriosis may manifest as isolated cases or outbreaks [1]. Though, uncommon to cause illness in the general population, *Listeria* is an important cause of life-threatening bacteraemia in immunocompromised groups such as neonates, pregnant women, elderly, transplant recipients and others with impaired cell-mediated immunity [2].

The source of infection is generally through animal products such as under-cooked meat and unpasteurized milk [2]. Pregnant women have a 17-fold increased risk of developing listerial bacteraemia, while two-third of babies born to such mothers develop clinical listeriosis [2]. Listeriosis in pregnancy can lead to abortion, stillbirth and premature delivery. In neonates, it can lead to sepsis, pneumonia and meningitis [1].

Perinatal listeriosis is rarely life-threatening to the mother but neonatal morbidity and mortality are common. Neonates can acquire infection trans-placentally, via aspiration of infected meconium or in rare instances by cross-contamination in new born nurseries. Even with appropriate treatment, the overall mortality with listeriosis is 30% [2].

To our knowledge, there are no published case reports of neonatal listeriosis in Sri Lanka. We report a case of early onset neonatal listeriosis, with meningitis.

Case report

A 22-hour-old, preterm baby was admitted to the neonatal unit with high fever, poor feeding and respiratory distress. Delivery was by an emergency caesarean section, due to reduced fetal movements along with an abnormal cardiotocogram (CTG), at 36 weeks period of amenorrhoea (POA). Baby was born non-asphyxiated with an APGAR score of 1⁹ 5¹⁰ 10¹⁰. Birth weight was 2450g and he was, thus, handed over to the mother.

In view of clinical signs of sepsis, baby was started on intravenous benzylpenicillin and gentamicin after septic screen. C-reactive protein (CRP) on admission was 84 mg/dl. The high CRP and the clinical instability of the baby made us change the antibiotic to intravenous (IV) cefotaxime. Cerebro-spinal fluid analysis confirmed bacterial meningitis. Subsequently, we were informed that the blood culture was positive for *Listeria monocytogenes* at 7.2 hours of incubation. IV ampicillin along with IV gentamicin were started when baby was 65 hours of age on advice from the microbiology team. A repeat blood culture done prior to starting IV ampicillin also showed positivity for *L. monocytogenes*.

Tests for basic organ functions were performed and found to be normal. Chest X-ray did not show significant inflammatory changes. Ultrasound brain, abdomen and renal system did not detect evidence of granulomatous inflammation or abscess. 2D echo cardiogram excluded evidence of endocarditis. Baby was weaned off from respiratory support and was stable on room air by day 4.

Mother was noted to be sick with high fever and high CRP of 151 mg/dl around the time of delivery. She was also treated with IV ampicillin & IV gentamicin to which she readily and completely responded. Her sepsis screen did not reveal evidence of listeriosis.

Mother admitted to increased consumption of dairy products including un-pasteurized cow's milk in the 2nd & 3rd trimester with the intention of improving the health status of the baby and herself. She denied taking raw or undercooked meat during the pregnancy.

Table 1: Results of laboratory Investigations

WBC	5.8*10 ⁹ g/L
PMN	3.78*10 ⁹ g/L
LYM	1.7*10 ⁹ . g/L
HB	17.8 g/dL
PLT	197*10 ⁹ g/L
CRP	84mg/dL
Na	138mmol/L

K	6.5mmol/L
Cr	0.44 mg/dL
AST	29u/L
ALT	12u/L
ALP	98u/L
Blood culture	<i>Listeria monocytogenes</i> after 7.2 hours of incubation

Table 2: Cerebrospinal fluid (CSF) analysis

Colour	Turbid
Protein	118mg/dL
Sugar	47mg/dL
White blood cells	65/mm ³
Polymorphs	60/mm ³
Red cell count	2080/mm ³
Culture	No growth

Discussion

Neonatal listeriosis is frequently under diagnosed. Diagnosis of *Listeriosis* in pregnancy is difficult as most cases are asymptomatic but it can lead to abortion and still birth [1]. *L. monocytogenes* can appear Gram variable and look like diphtheroids, cocci or diplococci and isolates are often discarded as a contaminant [2]. Frequent Failure to isolate the bacteria in blood and tissue cultures may contribute to paucity of confirmed diagnoses.

Since neonatal listeriosis is typically a transplacental infection, it is essential to be aware of symptoms and signs present in the pregnant woman as well as in the neonates. Maternal presentation falls into two main patterns according to the MONALISA (Multicentered Observational National study on Listeriosis and Listeria) cohort study conducted in France [3].

1. Non-specific obstetric signs – abnormal uterine contractions and abnormal fetal heart rate (75%)
2. Fetal loss (21%)

Our patient was delivered prematurely by emergency section due to abnormal CTG.

Neonatal listeriosis has 2 different clinical presentations¹

1. Early onset disease – presents within the first six days of life, usually preterm with evidence of sepsis with circulatory and/or respiratory insufficiency

2. Late onset disease – presents after initial six days of life - usually full term, previously healthy neonate presents with meningitis or sepsis.

In our case, the baby presented with fever and respiratory distress. However, it should be noted that fever is not always present in neonatal listeriosis and it is only reported in 12-85% of patients [3], which further explains why the diagnosis of neonatal listeriosis can be challenging. Although meningitis is most commonly associated with late onset disease, in our patient, meningitis was diagnosed with early onset disease [3].

Other important findings such as meconium-stained liquor, especially with a brown murky appearance, may raise suspicion of neonatal listeriosis. Placental sample culture is the most sensitive method to diagnose maternal-foetal listeriosis [3]. Therefore, it is advisable to perform placental sample analysis in all preterm deliveries with meconium-stained liquor, abnormal CTG and in instances of abnormal foetal heart rates [1,4]. Maternal vaginal sampling is frequently negative, reflecting the hematogenous seeding of the placenta [3]. Unfortunately, in our patient, placenta was unavailable for sampling by the time the neonatal blood culture was found to be positive.

Anti-listeriolysin serologic tests can help in the diagnosis of invasive and non-invasive listeriosis [1]. The recently developed infrequent-restriction-site polymerase chain reaction (IRS-PCR) test is capable of discriminating strains related to non-invasive listeriosis from invasive listeriosis [5].

The antibiotic of choice for listeriosis is ampicillin, ideally combined with an aminoglycoside for synergism [1]. *Listeria* is universally resistant to 3rd generation cephalosporins [3].

In the current case, presumptive diagnosis of bacterial sepsis was made initially due to fever and respiratory distress and empirical treatment with IV benzylpenicillin and gentamycin was started. High CRP and the positive blood culture prompted us to evaluate the CSF which was positive for evidence of bacterial invasion.

Conclusion

This case highlights, the importance of including *Listeria* infection in the differential diagnosis of sick neonates, especially those presenting with preterm delivery with meconium-stained liquor, respiratory distress and positive maternal infection and fever or having exposure to contaminated foods, especially raw meats and dairy products. Diagnosis may be challenging unless the clinician has a high index of suspicion. Prompt treatment with appropriate antibiotics is crucial as 3rd generation cephalosporins are not effective due to universal resistance of *Listeria*.

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