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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/20514
DOI URL: http://dx.doi.org/10.21474/IJAR01/20514

RESEARCH ARTICLE

"UNMASKED NEONATAL LISTERIOSIS"

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Manuscript Info

Manuscript History
Received: 28 December 2024
Final Accepted: 31 January 2025
Published: February 2025

Key words:-
Early Onset Neonatal Sepsis, Listeriosis, MDT Collaboration and Dynamics, Perinatal Care

Abstract

Neonatal sepsis, a life-threatening bloodstream infection occurring within the first 28 days of life, demands swift identification and intervention to prevent devastating outcomes. Categorized into early-onset sepsis (EOS), emerging within the first 7 days, and late-onset sepsis (LOS), developing thereafter, this distinction is crucial for tailoring management strategies to minimize neonatal morbidity and mortality [1]. While evidence-based guidelines offer a roadmap for intervention, the dynamic and unpredictable nature of neonatal sepsis underscores the critical importance of rapid, coordinated responses.

Introduction:-

Neonatal sepsis, a life-threatening bloodstream infection occurring within the first 28 days of life, demands swift identification and intervention to prevent devastating outcomes. Categorized into early-onset sepsis (EOS), emerging within the first 7 days, and late-onset sepsis (LOS), developing thereafter, this distinction is crucial for tailoring management strategies to minimize neonatal morbidity and mortality [1]. While evidence-based guidelines offer a roadmap for intervention, the dynamic and unpredictable nature of neonatal sepsis underscores the critical importance of rapid, coordinated responses.

This case report delves into the high-stakes scenario of neonatal sepsis due to Listeria monocytogenes, shedding light on the pivotal role of early detection, maternal care, and timely multidisciplinary action. Beyond clinical outcomes, it emphasizes the systemic gaps in healthcare communication and collaboration, highlighting the need for continuous refinement of multidisciplinary team (MDT) approaches to enhance patient safety and outcomes.

Case Presentation

Maternal Background

A 31-year-old in her third pregnancy female at 35 weeks and 4 days gestation presented to the emergency department (ED) with complaints of:

. Progressive labor pain: Pain severity rated 4/10.

. Brownish vaginal discharge for one night with Feverish sensation and reduced fetal movements since pain started.

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She was under regular antenatal follow-up with normal scans and genetic tests. Pertinent details of her obstetric and medical history include:

Current pregnancy:
. LMP: 28/04/2024 | EDD: 02/02/2025.
. Gestational diabetes (GDM): Early OGTT was normal but not repeated at 28 weeks.
. Departmental scan (29 weeks): Large-for-gestational-age fetus, AFI at the upper limit.
. GBS status: Negative.
Previous pregnancies:. Two spontaneous vaginal deliveries:
- Baby 1: 2.3 kg. - Baby 2: 3.6 kg (induced at 42 weeks due to abnormal Doppler signals).
. GDM in first pregnancy (diet-controlled).
. Medical and surgical history: IUD (5 years) followed by OCP use (1 year)
Clinical Presentation in ED
By Vital Signs: Slight tachycardia, later developing fever (38.6 °C).
Abdominal Exam: Confirmed uterine contractions.
Vaginal Exam:. Intact membranes.. Cervix: Soft, central, 1 cm long.
. Discharge: Foul-smelling, curdy white.
CTG: Category II: -Baseline fetal heart rate: 180 bpm.
- Reduced variability (<5 bpm), variable decelerations, no accelerations.
- Contractions: 2 every 10 minutes.

Laboratory Findings:
FBC: Elevated WBCs (25.4 x $10^3/\mu L$), suggestive of infection.
Given the suspicion of Listeria monocytogenes (based on characteristic discharge) and worsening CTG, the obstetric team proceeded with an emergency lower-section C-section.

Neonatal Findings
Delivery Details. APGAR Scores: 4, 6, and 7 at 1, 5, and 10 minutes, respectively.
. Liquor: Foul-smelling, meconium-stained.
. Initial state: - Flat, cyanosed, no movement, heart rate <50 bpm.
- Rapid improvement within 2 minutes after suctioning, with normalized color, respiration, and heart rate.
. Post-delivery: After 10 minutes of observation and a normal neonatal exam, the baby was transferred to NICU.

NICU Course
Initial Findings
. Blood Gas: Respiratory acidosis (improved over time).
Chest X-Ray: Diffuse bilateral opacification consistent with respiratory distress syndrome (RDS).

Management:
Started on CPAP, later weaned to HFNC then room air.
Septic Workup and Culture Results
. Blood culture: Positive for Listeria monocytogenes.
. Blood PCR: Confirmed Listeria.
. Lumbar puncture (LP): Initial attempt on 4^{th} Day of life was a dry tap. Reattempt on 6^{th} day of life confirmed meningitis:
- CSF protein: 153 mg/dL. - CSF glucose: 35 mg/dL.
- WBC in CSF more than 100 mainly Lymphocytes.

Infectious Markers

Marker	Highest Value	Last Value
CRP	139.2 mg/dL	4.4 mg/dL
Procalcitonin	4.51 ng/mL	0.23 ng/mL
WBC	25.4 x $10^3/\mu L$	11.7 x $10^3/\mu L$

Antibiotic Therapy
The baby was started on:
. Ampicillin (meningitic dose) for 21 days (organism sensitive).

. Piperacillin-tazobactam and gentamicin discontinued after culture confirmation.
Progress and Outcome
.the baby discharged after 21 days of intravenous Ampicillin in stable and good condition after being under Continuous monitoring of vitals, inflammatory markers, activity, and nutrition and Respiratory and systemic stability achieved completely prior to discharge.
. Vaccinations (Hepatitis B, BCG) administered prior to discharge.

Discussion:-

Neonatal sepsis remains a critical challenge in perinatal medicine, demanding prompt recognition and decisive action to prevent severe morbidity and mortality. This case of early-onset sepsis (EOS) caused by Listeria monocytogenes exemplifies the complexities of diagnosis, clinical decision-making, and multidisciplinary collaboration required for optimal outcomes.

Pathophysiology and Risk Factors

Listeria monocytogenes is a facultative intracellular pathogen with the ability to breach the placental barrier, leading to vertical transmission through contaminated amniotic fluid or hematogenous spread during maternal bacteremia. Pregnant women are particularly susceptible due to immunological adaptations during pregnancy, such as the shift to a Th2-dominant immune response. Risk factors include the consumption of high-risk foods, including unpasteurized dairy products, soft cheeses, deli meats, smoked seafood, and unwashed produce.

In this case, the mother presented with fever, foul-smelling vaginal discharge, and abnormal CTG findings, all of which strongly suggested intrauterine infection. Postnatal confirmation of Listeria monocytogenes reinforced the clinical suspicion, while the neonate's rapid progression to respiratory distress syndrome (RDS) and elevated inflammatory markers highlighted the pathogen's virulence and the critical need for swift intervention.

Clinical Decision-Making

Timely and well-informed clinical decisions were pivotal in averting severe fetal compromise. The combination of maternal symptoms, laboratory abnormalities, and abnormal CTG findings necessitated an emergency C-section. Evidence suggests that early delivery in suspected intrauterine infections can significantly improve neonatal outcomes by limiting exposure to pathogenic organisms.

The neonate's presentation with respiratory acidosis and bilateral pulmonary opacifications on imaging was consistent with neonatal listeriosis, which often manifests as sepsis, pneumonia, or meningitis. Despite the initial delay in lumbar puncture due to the neonate's critical condition, confirmation of Listeria monocytogenes via blood culture enabled targeted antibiotic therapy, significantly reducing mortality risks.

Importance of Multidisciplinary Collaboration

This case underscores the indispensable role of seamless communication and collaboration between the obstetrics and neonatology teams. The obstetric team's vigilance regarding vertical transmission and their timely notification to the neonatology team allowed for anticipatory preparation, ensuring that neonatal resuscitation, respiratory support, and empirical antibiotics could be initiated without delay.

The success of this approach aligns with evidence that multidisciplinary team (MDT) dynamics improve outcomes in complex perinatal infections. A systematic review in The Lancet emphasizes that coordinated MDT care reduces diagnostic delays, expedites treatment initiation, and enhances maternal and neonatal outcomes. Structured communication tools like SBAR (Situation, Background, Assessment, and Recommendation) have been shown to further improve information flow between teams, fostering precision and clarity in high-stakes scenarios.

Challenges and Future Directions

This case also highlights some of the inherent challenges in managing neonatal sepsis. The delay in performing a lumbar puncture, while clinically justified, reflects the difficulty of balancing diagnostic completeness with patient stability. Future research should prioritize non-invasive biomarkers for Listeria monocytogenes to enable rapid diagnosis and tailored therapy without compromising patient safety.

Preventive strategies for listeriosis in pregnancy also warrant greater emphasis. Studies demonstrate that adherence to food safety guidelines—such as avoiding high-risk foods and maintaining proper food hygiene—significantly

reduces the incidence of listeriosis. Routine antenatal counseling on dietary precautions, early symptom recognition, and the importance of timely medical care should be integrated into clinical practice.

This case of neonatal listeriosis illustrates the intersection of clinical vigilance, timely decision-making, and collaborative care in addressing complex perinatal infections. It also underscores the importance of preventive education and advances in diagnostic techniques to enhance maternal and neonatal outcomes in similar high-risk cases.

Conclusion:-

This case shines a spotlight on the life-saving impact of early recognition, timely intervention, and meticulous management of maternal infections with the potential for neonatal transmission, such as listeriosis. It demonstrates how swift clinical decisions and effective interdepartmental collaboration can prevent catastrophic neonatal complications, offering a blueprint for handling similarly high-risk scenarios.

Preventive strategies remain paramount, including educating pregnant women about avoiding high-risk foods and emphasizing the importance of consistent antenatal care to mitigate preventable risks. Beyond individual patient care, this case underscores the need for healthcare systems to cultivate a culture of collaboration, supported by structured protocols and communication frameworks, to deliver seamless and effective care.

Ultimately, this case serves as a testament to the power of vigilance, teamwork, and proactive communication in navigating complex perinatal challenges. It reminds us that coordinated care is not just a clinical necessity—it is the cornerstone of achieving the best possible outcomes for both mother and child.

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