



(CASE REPORT)



Malignant Pertussis in 2-Month-Old Infant: A case report

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Abstract

Pertussis, also known as whooping cough, is a highly contagious respiratory infection caused by *Bordetella pertussis*. This case report describes a 2-month-old female infant with malignant pertussis, complicated by marked hyperleukocytosis—a condition associated with poor prognosis. Upon emergency admission, the infant presented with severe respiratory distress, oral cyanosis, and bilateral wheezing. Laboratory tests revealed a white blood cell (WBC) count of 125 G/L, with hyperbasophilic lymphocytes observed on blood smear. A polymerase chain reaction (PCR) test confirmed *Bordetella pertussis* infection. Despite the prompt initiation of macrolide antibiotic therapy, the patient's condition deteriorated rapidly, and she died within 24 hours of admission to the intensive care unit. This case underscores the critical importance of early diagnosis and intervention in malignant pertussis and advocates for enhanced preventive strategies, particularly maternal vaccination during pregnancy to protect vulnerable neonates.

Keywords: Whooping cough; *Bordetella pertussis*; Leukocytosis; Blood smear; PCR

1. Introduction

Pertussis is a vaccine-preventable, highly contagious respiratory disease caused by *Bordetella pertussis*. While it often presents as a mild illness in older children and adults, it can be life-threatening in infants, particularly those under two months of age who have not yet received vaccination. Malignant pertussis is a rare and severe form of the disease characterized by extreme leukocytosis, respiratory failure, and potentially fatal cardiovascular complications[1]. We present a case of malignant pertussis in a 2-month-old infant with severe hyperleukocytosis and rapid clinical deterioration. This report highlights the need for early recognition and aggressive management, as well as the importance of preventive maternal immunization strategies.

2. Case Presentation

We report the case of a 38-day-old female infant born to consanguineous parents. The mother's obstetric history included 10 pregnancies, with five miscarriages, two stillbirths, two neonatal deaths, and one living child aged 10 years. The infant had not yet received her first dose of DTaP vaccine. Upon emergency department presentation, the patient showed signs of respiratory distress: she was conscious, hemodynamically stable, with a heart rate of 94 beats per minute and an oxygen saturation (SpO₂) of 89%. Physical examination revealed oral cyanosis, expiratory effort, and diffuse bilateral wheezing. No cardiac murmur or organomegaly was noted. Laboratory investigations showed marked leukocytosis with a WBC count of 125 G/L, including neutrophils at 55 G/L, lymphocytes at 53 G/L, and monocytes at 14 G/L. Peripheral blood smear demonstrated hyperbasophilic lymphocytes, occasionally polylobulated, with mature chromatin. These findings, combined with the clinical picture and progressive cough, suggested a possible *Bordetella pertussis* infection. PCR analysis confirmed the diagnosis. Antibiotic therapy with macrolides was initiated immediately.

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Despite aggressive supportive measures, the infant's condition worsened rapidly. She was transferred to the intensive care unit but passed away within 24 hours due to complications of the infection.

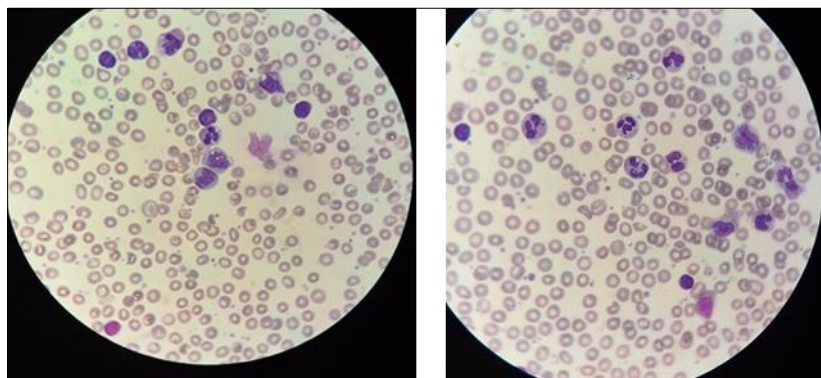


Figure 1 Blood smear showing neutrophils, normal and activated lymphocytes and monocytes

3. Discussion

Malignant pertussis in neonates is characterized by severe hyperleukocytosis, early respiratory failure, and high mortality. Leukocyte counts often exceed 100 G/L and are primarily driven by pertussis toxin-mediated lymphocytosis. This hematologic response is strongly associated with poor outcomes and is considered a predictive factor for mortality [2]. Although pertussis is vaccine-preventable, newborns remain vulnerable until they complete their primary immunization series. In Morocco, the National Immunization Program includes pertussis vaccination at 2, 3, and 4 months of age, with booster doses at 18 months and 5 years. However, waning immunity in adolescents and adults contributes to transmission to unvaccinated infants [3,4]. Our case is consistent with previous reports in which malignant pertussis presents in infants under two months of age, as noted in studies by Guillois and Kolind [2,4]. The leukocyte count in our patient (125 G/L) was comparable to cases described in the literature, including those by de Berry [5] (120 G/L) and Kolind[4] (97 G/L). Pierce et al. emphasized that WBC counts above 100 G/L are associated with high mortality in critically ill infants with pertussis [6]. PCR testing remains a critical diagnostic tool, especially when clinical features overlap with other respiratory pathogens such as RSV and CMV. Although antibiotic therapy is essential, its impact is limited once severe leukocytosis and respiratory failure have developed [7,8]. Emerging therapies for malignant pertussis include leukoreduction (via exchange transfusion), inhaled nitric oxide, and extracorporeal membrane oxygenation (ECMO). ECMO, in particular, has been shown to improve survival in infants with high-risk features, such as age below six months, leukocytosis >100 G/L, and pulmonary hypertension [9]. Unfortunately, our patient did not have access to ECMO.

4. Conclusion

Malignant pertussis is a rare but deadly condition in neonates, with extreme leukocytosis serving as a critical marker of severity and poor prognosis. Blood smear analysis can aid early recognition, and PCR remains essential for definitive diagnosis. This case highlights the importance of distinguishing leukemoid reactions due to infectious causes from hematologic malignancies in infants. Preventive measures, including maternal vaccination during pregnancy and booster doses every 10 years, are essential strategies to reduce infant morbidity and mortality from pertussis.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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