



## MALIGNANT PERTUSSIS IN NEONATES: MANY MORE MILES TO GO..!

### Paediatric

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### ABSTRACT

Pertussis in a young infant is often fatal as it can easily be misdiagnosed and because infants have weak immune systems before they receive routine infant immunization. The so called “whooping cough” can cause respiratory distress, hypoxemia, and disease progression leading to increased morbidity or mortality. Malignant pertussis is characterized by severe respiratory failure, pulmonary hypertension, leucocytosis and death. Herein, we report the case of a 26-day-old male newborn who presented with cough-cold and difficulties in breathing. After admission, her cough worsened and was accompanied by persistent hypoxemia and apneic spells. With worsening clinical condition, seizures were noticed on second day. With provisional diagnosis of Malignant Pertussis, injectable azithromycin was added. Double volume exchange transfusion was performed. Unfortunately, patient died from pulmonary hypertension, intractable seizures and multi-organ failure. We suggest that all pregnant women should receive pertussis vaccinations in the third trimester of pregnancy.

### KEYWORDS

pertussis, child, severe leucocytosis, pulmonary hypertension, immunization, exchange transfusion

### INTRODUCTION:

Pertussis has been a vexing public health problem for decades. Robust infant and childhood pertussis immunization programs have resulted in dramatic reduction in morbidity and mortality however; some countries have experienced “Pertussis resurgence” along with associated morbidity/mortality and consequent financial burden. Many developing countries continue to grapple with pertussis control through routine vaccination efforts and attempts to build effective surveillance systems. Against this backdrop, significant additions to scientific literature on “Malignant” pertussis are of great interest to the global community.

In 2016, the World Health Organization reported 139535 cases of pertussis, with a mortality rate of 4%.

Pertussis is an acute respiratory tract infection and a highly contagious endemic bacterial disease caused by *Bordetella pertussis* that was initially reported in the 1500s. It is acquired through direct contact or inhalation of respiratory droplets. Severe pertussis in non-immune infants is known to provoke 3 different syndromes:

- Severe apneic/bradycardiac Pertussis
- Pneumo Pertussis
- Malignant Pertussis

**Malignant pertussis:** Evolving combination of pneumonia, cardiopulmonary failure, severe leucocytosis, neurological involvement & severe pulmonary hypertension leading to death in spite of intensive therapeutic measures.

The major risk factors for high mortality are high white blood cell count and severe pulmonary hypertension, age less than 6 months, prematurity and incomplete immunization. The young infants who died in these report was too young to have benefited from protection provided by the routine infant immunization, here in; we report the case of a newborn infant with malignant pertussis infection.

### Case Report:

A 26 days old male full term normal delivered exclusively breastfed child with birth weight of 2.6 Kg without any perinatal complications was admitted with cough, cold for 5 days & difficulty in breathing for 2 days. On examination patient had HR of 170/min, RR of 62/min with respiratory distress and spo2 was 92% on air. On auscultation bilateral crepitations appreciated. Antibiotics and supportive care started as per NICU protocol.

After hospitalization paroxysmal cough and hypoxic episodes were observed with persistent tachycardia and hepatomegaly. Seizures noticed on day 2 of admission, which were resistant in spite of 3 anti-epileptics. Patient was kept on ventilator with inotropic support in view of worsening clinical status.

Serial chest x-rays revealed bilateral bronchopneumonia and CBC showed leucocytosis (40,000) and lymphocytosis with ALC >15,000. 2D echo was suggestive of higher pulmonary pressures. USG Cranium

was normal and CSF was sterile.

With provisional diagnosis of Malignant Pertussis, injectable azithromycin was added. Double volume exchange transfusion was performed at 52 hours of hospitalization in view of further clinical deterioration and persistent leucocytosis to eliminate toxin and inflammatory mediators.

Despite of aggressive intensive therapeutic measures patient died on 90<sup>th</sup> hour of hospitalization.

### DISCUSSION:

The clinical spectrum of *B. pertussis* illness in young infants extends from a trivial illness to severe illness resulting in death. This spectrum is influenced by many factors, including the presence and magnitude of transplacentally acquired antibodies to *B. pertussis* antigens, the sex of the infant, the age and weight of the infant at the time of exposure, the concentration of the bacterial exposure, and whether or not the infant was breastfed, co-infection with respiratory viruses and genetic factors related to the pathogen or the infant.

Pertussis in the first three months of life is frequently severe and often fatal. Young infants who are too young to be immunized are at high risk of infection from their household members. The production of protective antibodies to *B. pertussis* in newborns is most important for the prevention of *Bordetella* infection.

The greatest risk factor for pertussis in young infants is family size and extended family size. The larger the family and extended family size, the greater the likelihood that there is a person with a cough illness that has not been recognized as pertussis. Children with severe, potentially fatal illness will develop pulmonary hypertension and pneumonia and will have rapid pulse and respiratory rates. Death is associated with hypertension and organ failure. It is important to note that although apneic episodes are frightening, they do not cause death. However, the hypoxia associated with an apneic episode may be a causative factor in later epilepsy and subsequent intellectual impairment.

### CONCLUSION:

Malignant pertussis is a severe disease that is almost always fatal. Our data suggest that a predictor of more severe Pertussis disease in young infants is an elevated and rapidly rising WBC count, making early and serial WBC count determinations critical to the evaluation of all infants with suspected or proven pertussis. Furthermore, close monitoring of heart and respiratory rates is imperative because these were demonstrated to correlate with more severe disease progression. This report highlights the importance of aggressive supportive care, as well as early implementation of Exchange transfusion, during the management of infants with severe pertussis.

Maternal vaccination in the third trimester of pregnancy, however, is likely to result in high levels in the mother at a time of maximum transplacental transfer of antibodies to the infant. These immunizations are likely therefore to confer protection against

pertussis in the first weeks of life, however the effectiveness against clinical infection has yet to be shown. Although no serological guidelines for protection against pertussis have been defined, high levels of antibodies are thought to provide better protection than low levels.

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