Education-Family Physician Corner

Challenges of Pertussis in Early Infancy

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Pertussis (whooping cough) is an infection caused by the bacterium Bordetella pertussis. It causes an irritating cough that often develops into prolonged bouts of cough which is commonly followed by the characteristic 'whoop' sound. Infants always present with apnea and cyanosis instead of whoop.

We report a three-month-old female infant who was brought to the hospital for her first vaccination against pertussis and was found to have prolonged bouts of cough. Close clinical observation of the characteristics of the cough was a vital indicator of her diagnosis. The diagnosis of pertussis was confirmed by positive nasopharyngeal swab culture with Bordetella.

Diagnosis of pertussis in early infancy can be missed. This is due to the overlap with other diseases such as bronchiolitis and bronchopneumonia associated with viral infections. Early vaccination according to the scheduled time can lead to prevention of pertussis. There is significant improvement and good response to the treatment with macrolides.

Bahrain Med Bull 2018; 40(4): 235 - 236

Pertussis is a highly contagious bacterial disease[1]. Usually, the symptoms begin with flu-like illness, such as fever, mild cough and runny nose followed with attacks of prolonged cough for weeks.

Three stages of the clinical course of pertussis were identified: catarrhal, paroxysmal and convalescence.

Bacterium Bordetella pertussis is the causative organism. The disease transmits through air droplets. The contagion period is from the start of symptoms up to three weeks of coughing bouts.

Some infants develop severe clinical manifestations and prolonged bouts of coughing which could continue for more than two months[2].

Pertussis is often misdiagnosed as an upper respiratory tract infection, bronchiolitis or pneumonia[3]. Therefore, overlap with other respiratory problems makes the diagnosis of pertussis difficult in early infancy.

Scientific efforts were directed to make the acellular pertussis vaccines more effective and less reactogenic than whole-cell vaccine[4]. It contains purified or recombinant Bordetella pertussis antigens.

After the establishment of the vaccination program, whooping cough has been underestimated in the clinical setting. Pertussis is increasing in frequency among children too young to be vaccinated and in adolescents[5].

The implementation of vaccination in the 1950s decreased the mortality and morbidity of whooping cough, but since that time pertussis cases in vaccinated population had been found.

The aim of this presentation is to report a case of an infant brought for his first vaccination against pertussis and was found to have whooping cough.

THE CASE

A three-month-old female infant was brought to the well-baby clinic for her first vaccination. The mother gave a history of dry cough for three weeks which is paroxysmal in nature, not responding to bronchodilators and followed with post-tussive green vomit. This was associated with decreased oral intake and decreased urinary output. There was no history of fever, skin rash or change in bowel habits.

The family gave a history of admission as bronchopneumonia, treated with intravenous antibiotics and bronchodilators and discharged in good condition. Her mother recalled improvement in her cough for 2 days after discharge, however, she started coughing in prolonged bouts associated with facial congestion and cyanotic episodes.

During examination, the baby was febrile and developed one bout of prolonged cough associated with facial congestion and vomiting. Other vital signs were within normal, but her chest was full of rhonchi and crepitations. During observation, she developed another 3 bouts of prolonged cough. Complete Blood Count (CBC) revealed high white blood cells count (WBC) of $41.5x10^9/l$, mainly lymphocytes

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(Lymphocytes 66.2%, Neutrophils 23.7%), thrombocytosis (platelets 613 *10^9/l, hemoglobin of 12.4 g/l). The urea and electrolytes were normal. Chest X-ray was suggestive of bronchopneumonia. The diagnosis of pertussis was confirmed by positive nasopharyngeal swab culture with Bordetella.

Initially, she was started empirically on intravenous cefuroxime and nebulized bronchodilators but she continued to have fever. Therefore, antibiotics were changed to ceftriaxone. Azithromycin was added following confirmation of pertussis by culture. There was a significant improvement in her clinical condition after she received Azithromycin and was discharged in good condition.

DISCUSSION

Pertussis in early infancy usually presents with severe symptoms and it remains a considerable problem in many countries regardless of developmental status[7]. Furthermore, even with intensive care support, infants with pertussis pneumonia still die. Hence, prevention is the key. The infant can present with the initial symptoms of the disease or its complications like bronchopneumonia, as in our patient.

The source of pertussis in infants under three months of age is not clear. However, in developed countries with intensive vaccination programs usually the source is the adults. In general, B. pertussis infection in adolescents and adults is the most significant source of the transmission to young unprotected infants[8].

Several studies revealed that a number of children experienced bouts of prolonged cough after chest infection. Therefore, prolonged cough represents the cornerstone of most chest infection[9]. The characteristics of the pertussis cough which is more prolonged followed with a whoop need close clinical observation by a primary or secondary care pediatrician.

The rate of hospitalization and incidence of pertussis in infants is expected to be moderately decreased if vaccination is given according to schedule[10]. In this case report, there was delayed vaccination as the baby was brought for his first dose of pertussis vaccine at the age of three months instead of two months.

CONCLUSION

Pertussis in early infancy usually presents with severe symptoms and complications which require prolonged hospitalization. Young infants can present with apnea and cyanotic episodes, while, older children develop prolonged cough followed by a whoop. Proper history taking and assessment could underpin the diagnosis. Prevention with organized and scheduled vaccination programs remain the key to decrease pertussis and its complications. Macrolides are the treatment of choice for post-exposure treatment of pertussis.

Author Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflicts of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 9 September 2018.

Ethical Approval: Approved by the Research Ethics Committee, Bahrain Defence Force Hospital, Bahrain.

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