Case Report / *Olgu Sunumu*

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A Case of Pertussis Presenting Only with Apnea

Sadece Apne ile Prezente Olan Bir Boğmaca Olgusu

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Abstract

Pertussis is a respiratory tract infection caused by *Bordetella pertussis* that can be seen in all age groups; it causes high mortality and morbidity rates especially in infants. Typical clinical findings include prolonged paroxysmal cough and/or vomiting after coughing. It may present with apnea and bruising without cough, especially in small infants and neonates. Our one-month-old patient was hospitalized with isolated apnea. Clinically, the patient had no additional symptoms including cough and no pathological findings were found except for elevated leukocytes and thrombocytes in the examinations performed on admission. Due to frequent recurrence of apnea, mechanical ventilator was required, and the patient was followed up in intensive care unit. During this period, additional complications such as pneumothorax and aspiration pneumonia developed. During the follow-up, many investigations were carried out for the etiology. The patient tested positive for *B. pertussis* via polymerase chain reaction, and *B. pertussis* growth was confirmed in culture. After 18 days in intensive care and an additional seven days in the ward, the patient was discharged in good health. This case represents one of the rare instances of pertussis presenting with isolated apnea. The case is presented to highlight the importance of recognizing pertussis, its potential to present with atypical symptoms, and the critical role of vaccination during pregnancy and infant care in preventing pertussis infections.

Keywords: Apnea, pertussis, infant, Tdap

Öz

Boğmaca, *Bordetella pertussis*'in neden olduğu tüm yaş gruplarında görülebilen bir solunum yolu enfeksiyonudur; özellikle süt çocuklarında yüksek mortalite ve morbidite oranlarına sebep olur. Tipik klinik bulguları arasında uzamış paroksismal, boğulur tarzda öksürük ve/veya öksürük sonrası kusma yer alır. Özellikle küçük infantlarda ve yenidoğanlarda öksürük olmaksızın apne ve morarma ile prezente olabilir. Bir aylık hastamızın izole apne teşhisiyle kliniğe yatışı gerçekleştirilmiştir. Klinik olarak öksürük dahil hiçbir ek semptomu bulunmayan hastanın başvuru sırasında alınan tetkiklerinde yüksek lökosit ve trombosit dışında patolojik bir bulguya rastlanmamıştır. Apnelerinin sık tekrarlaması nedeniyle mekanik ventilatör ihtiyacı olup, yoğun bakımda takibine devam edilmiştir. Bu süreçte pnömotoraks ve aspirasyon pnömonisi gibi ek komplikasyonlar gelişmiştir. Takibi devam ederken etiyolojiye yönelik birçok araştırmalar yapılmıştır. *B. pertussis* polimeraz zincir reaksiyonu sonucu pozitif saptanan, kültürde de *B. pertussis* üremesi olan hasta 18 gün yoğun bakımın ardından yedi gün servis yatışı sonrası şifa ile taburcu edilmiştir. Bu vaka, nadir görülen ve izole apne ile seyreden boğmaca vakalarından biridir. Vaka, boğmaca hastalığına dikkat çekmek, atipik bulgularla seyredebileceğini hatırlatmak ve boğmaca enfeksiyonlarının önlenmesinde gebelikte ve bebek bakımındaki aşılamanın önemini vurgulamak amacıyla sunulmuştur.

Anahtar Kelimeler: Apne, boğmaca, infant, Tdap

Introduction

Pertussis is a respiratory tract infection caused by *Bordetella pertussis* that can be seen in all age groups but causes high mortality and morbidity especially in infants. Prolonged paroxysmal cough and/or vomiting after coughing are typical clinical findings. It may present with apnea and cyanosis without cough, especially in small infants and neonates. This case is presented to draw attention to the fact that pertussis cases may present with apnea without cough.

Case Report

A one-month-old female infant, born via cesarean section due to preeclampsia at 37+4 gestational weeks from a

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gravida 3, parite 3 (G3P3) pregnancy of a 35-year-old mother, weighing 3790 grams, was brought to the emergency department with complaint of cyanosis. Besides cyanosis, she had no additional symptoms such as coughing. The patient's general condition was good, physical examination was normal, and vital signs were stable. The patient was admitted to the hospital for clinical monitoring. During the hospital stay, she experienced five episodes of apnea accompanied by bradycardia lasting 30-60 seconds each day. Due to the increased frequency of apnea, she was transferred to the intensive care unit for close clinical monitoring. Subsequently, due to a further increase in the frequency and severity of apnea and cyanosis, she was intubated and connected to a mechanical ventilator. However, episodes of head and body retraction, accompanied by bradycardia and cyanosis, continued at an average of 15 times per day during ventilator monitoring.

During the first day of hospital admission, total leukocytes count were= 34000/mm^3 (26500 lymphocytes, 5450 neutrophils, 2400 monocytes), hemoglobin= 9.6 g/dL, and platelets= 483000/mm^3, and C-reactive protein was= 11.7 mg/L.

Liver, kidney functions, and electrolytes were normal. There were no specific findings on chest X-ray (Figure 1). Brain computed tomography and brain magnetic resonance imaging were normal.

The highest total leukocyte count was= 55000/mm^3 (22500 neutrophils, 23000 lymphocytes, 7840 monocytes) on the eighth day of hospitalization. Due to suspicion of sepsis during intensive care unit admission, ampicillin-cefotaxime therapy was initiated. On the second day of hospitalisation and the third day of symptom onset, it was learnt that the mother had not been vaccinated with tetanus, diphtheria, acellular pertussis (Tdap) vaccine during pregnancy in the anamnesis obtained from the family, multiplex polymerase chain reaction (PCR) and pertussis culture were sent from respiratory samples, and azithromycin was added to the treatment. On the same day, a chest tube was inserted due to the development of pneumothorax. The patient was extubated on the seventh day. Azithromycin was completed for five days and then discontinued.

Figure 1. Chest X-ray at the time of admission.

On the 10th day of treatment, due to aspiration of gastric fluid, the patient was diagnosed with aspiration pneumonia and started on piperacillin-tazobactam therapy. Levetiracetam therapy was initiated due to the inability to rule out convulsions. Echocardiography, electroencephalography, tandem mass, blood-urine organic acids, and blood amino acids were normal. *B. pertussis* PCR was positive in respiratory samples. *B. pertussis* was also grown in culture.

The patient, whose vital signs were stable and general condition was good, was transferred to the ward after 18 days of intensive care unit follow-up. During this time, no pertussis-like coughing episodes were observed. After seven days of ward monitoring, the patient was discharged with recovery.

Discussion

Despite widespread vaccination, pertussis cases have been increasing since the 1990s (1). It is more common in infants younger than one year of age and leads to higher mortality and morbidity in this age group (2,3).

The natural course of pertussis begins with a catarrhal stage characterized by mild cough and runny nose, followed by a paroxysmal stage marked by worsening cough, post-cough vomiting, cyanosis, and apnea. Apnea is mostly observed in infants younger than six months (4). It is typically associated with coughing spells but may occur only with apnea (5). In infants, apnea may be the sole manifestation of pertussis infection. However, data on the frequency of isolated apnea during pertussis infections are lacking in the literature.

This case was one of the rare instances where only apnea was observed, which is uncommon in pertussis cases. The timing of presentation during the autumn, when pertussis is commonly seen, the predominance of lymphocytes in leukocytosis without fever, and the absence of toxic, metabolic, radiological, and clinical findings explaining leukocytosis and the clinical condition raised suspicion of *B. pertussis* infection as a differential diagnosis. The fact that the patient had not yet received the pertussis vaccine and that the mother did not receive the vaccine during pregnancy were supportive factors for the diagnosis.

There are diagnostic methods including PCR, culture and serology in the diagnosis of pertussis. PCR is the most common and rapid method in the diagnosis of pertussis. It detects *B. pertussis* DNA in a swab sample taken from the nose or throat and has the highest sensitivity in catarrhal and early paroxysmal stages of the disease. With culture,

B. pertussis bacteria are detected by growing the nasal or throat swab sample in a special medium, but culture results take a long time, and sensitivity is low due to antibiotic use or previous vaccination. Serology involves the detection of immunoglobulin G antibodies. It is particularly useful for confirming the diagnosis in patients presenting in the late stage of the disease or during the recovery period (helping to confirm the diagnosis up to 12 weeks after the onset of symptoms), but this method is not useful in recently vaccinated individuals (6). These methods used in the diagnosis of pertussis are selected and combined depending on factors such as the age of the patient, severity of symptoms and stage of the disease, and the most accurate diagnosis is tried to be made. However, PCR is the preferred test because it provides rapid and accurate results.

Pertussis disease in the early infantile period may result in mortality and morbidity. The acellular pertussis vaccine is included in the quadrivalent mixed vaccine in the vaccination calendar of the Ministry of Health of the Republic of Türkiye and is administered in the second, fourth and sixth months. Prevention of pertussis in the early period of life is possible with vaccination (Tdap) of the mother during pregnancy (preferably between 27-36 weeks) and other people who will care for the baby (7). Babies born to mothers vaccinated with Tdap during pregnancy benefit from transplacental transfer of maternal pertussis antibodies, providing immunity in the first months of life when infants are at risk of severe pertussis and death. A retrospective cohort study has found that maternal Tdap vaccination is associated with a 91.4% reduction in the risk of pertussis among infants in the first two months and a 69% reduction in the first 12 months of life (8). Vaccination is extremely important in terms of reducing hospitalizations, preventing unnecessary examinations, and preventing loss of labor force as well as protection from the disease.

With this case report, we wanted to draw attention to pertussis, emphasize the importance of vaccination, and emphasize that pertussis may present with atypical clinical findings such as isolated apnea in the early period of life.

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