

VIRAL-BACTERIAL COINFECTION – A CASE REPORT

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Abstract: *Viral bacterial coinfections are encountered in about one third of community acquired pneumonia cases in children. There is however very difficult to differentiate pneumonias' etiology using clinical, laboratory and radiological examination. We present a case of viral-bacterial coinfections and the challenges that this case imposed in both diagnostic and treatment decision. We shall also review the literature that addresses this issue.*

Key words: *Viral –bacterial coinfection, pneumonia, infant.*

1. Introduction

Childhood community acquired pneumonia has an estimated death case number of 2.5 million/year. Several bacteria and viruses along with their combination may cause the disease [5].

There is very difficult to differentiate between viral, bacterial or mixed infection using clinical, radiological or laboratory methods. Blood cultures are of limited use and their interpretation is influenced by the severity of the disease, while lung puncture, BAL (bronho alveolar lavage) along with protected specimen brush techniques are rarely done and are invasive [13].

2. Case presentation

We present a case report of an infant girl 8 month old, admitted at the University Childrens' Hospital from Brasov, during 09.02-20.02.2014. She was from rural area

and was reffered to us for nasal obstruction along with rhinorrhea, cough and difficult breathing. At admittance in our hospital the mother signed informant consent.

She was the fourth child of the family, from a twin pregnancy born at 38 weeks of gestation. Her birth weight was 1600 gr, she was breast-fed for one week than received cow milk and was vaccinated according to the National Immunization Program (NIP). She had 3 other admittances for diarrhea and one admittance for a respiratory tract infection.

At admittance she was feverish 38.7°C, had a second degree of malnutrition with a ponderal index (PI) calculation of 0.75, capillary refill time >3 seconds, rhinorrhea, nasal obstruction with nasal flarring, dyspnea and tahypnea, O₂ saturation under 92%, rales on both sides of the lungs, with a normal heart rate, no loose stools, normal neurological exam.

Her leucocytes were 20900/mm³ with a

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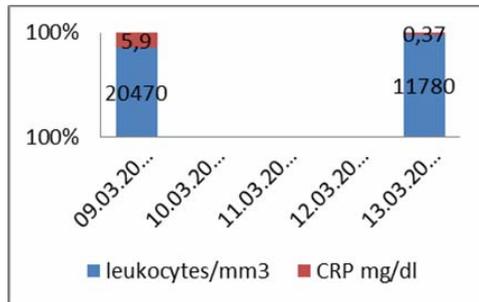
predominance of neutrophils, CRP (C-reactive protein) over 5, rapid test for RSV positive but the X-ray showed an alveolar pneumonia, while the nasal swab was positive for *Streptococcus pneumoniae*. Blood culture was negative, urine culture negative, abdominal ultrasound was normal.

Her hemoglobin level was of 9.9g/dl, with a hematocrit of 28% and a ferrum level of 21µg/dl.

The ENT (ear, nose, throat) exam showed otitis media and was performed the third day after admittance at the hospital.



Fig. 1. *Thoracic X-ray, showing an alveolar pneumonia*



Graph. 1. *Dynamic of leucocytes during hospitalization period*

Final diagnosis was: 1. Alveolar pneumonia mixed viral-bacterial coinfection. 2. Moderate respiratory failure (O_2 saturation under 92%). 3. Otitis media. 4. Second degree malnutrition. 5. Anemia.

Treatment was started with antibiotic,

mainly ceftriaxon on a daily dose of 100mg/kg divided into two administrations for 10 days, O_2 supplementation during the first three days until the oxygen saturation were constant above 95%, aerosoles with saline and probiotics.

The evolution was favorable with complete resolution of the alveolar pneumonia at the control X ray performed on the discharge day.

3. Discussion

We present a case report of a mixed viral-bacterial infection in an infant admitted for cough and difficult breathing that had a positive RSV test performed immediatly after admittance.

Several studies have shown that at children under the age of 2 more than 1/3 of the pneumonia cases are of mixed etiology [3].

Our case report shows this coinfection of RSV and alveolar pneumonia most probably due to pneumococcus.

The pathology of mixed viral-bacterial coinfection is determined by several factors. Colonization is facilitated by viruses.

Even in our case we may presume that the RSV was favouring the pneumococcus [1].

The interaction between viruses and pneumococcus include synergistic production of neuraminidase to clear the mucus and thus the distrupction of mechanical barriers to pneumococcal disease [8].

Viral infection destroys the respiratory epithelium exposing the membrane basement and enhancing bacterial adherence [1].

There is also immunosuppression, apoptosis of the neutrophils along with the alteration of the phagocytic function with the promotion of adherence and attachment of pneumococcus through TNF and IL [7].

A study from Denmark has shown that there is a 7.1 fold increase in IPD due to pneumococcus within 30 days after RSV infection [10].

Clinical studies have shown that there is very difficult to distinguish between viral and bacterial infection and that cough appears more often in relation with RSV rather than to bacterial infection [4]. Also in our case cough and difficult breathing was one of the admittance reasons.

Virkki et al. were among the first to show that CRP above 5 with the number of leucocytes above 15000/mm³ along and with the age under 2 years may be used as tools in establishing bacterial etiology [12].

At our toddler CRP was above 5 and the leucocytes exceed the value of 15000/mm³ suggesting that despite the positivity of the viral test for the RSV that there was a mixed viral-bacterial coinfection.

Otitis media studies in children have shown that 20% of the cases were mixed infection with a peak after of occurrence 3-4 days after the onset of respiratory infections [2].

We also found in our case at the ENT exam the presence of acute otitis media.

Despite the vaccination with PCV the number of visits to the emergency departments were unchanged in recent study suggesting that vaccinating also against influenza may have a positive impact [9].

On the other hand Madhi et al. showed that vaccination with PCV has reduced the X ray confirmed pneumonia for the vaccinated children compared to those that were not in both HIV positive and HIV negative ones [6].

4. Conclusion

We present a case report of a mixed viral bacterial coinfection in an infant under the age of 1 along with a review of the literature.

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