

Obliterative bronchiolitis due to respiratory syncytial virus and mycoplasma pneumoniae : a case report

Supatra Limudomporn*
Sasithorn Likitnukul*

Nuanchan Prapphal*
Vacharee Bouchum**

Limudomporn S, Prapphal N, Likitnukul S, Bouchum V. Obliterative bronchiolitis due to respiratory syncytial virus and mycoplasma pneumoniae : a case report. Chula Med J 1990 Oct ; 34(10) : 781-787

A case of obliterative bronchiolitis following respiratory infection caused by respiratory syncytial virus (RSV) and mycoplasma pneumoniae in an 8 month old infant is reported. The patient was previously healthy, she developed respiratory failure from acute bronchiolitis. Positive fluorescent test for RSV from tracheal aspiration and diagnostic serum titers for mycoplasma pneumoniae were noted. After initial recovery, she had persistent wheezing which progressed to irreversible small airway obstruction and finally expired from cor-pulmonale. The diagnosis of obliterative bronchiolitis was confirmed by ventilation-perfusion lung scan. It should be stressed that dual infections from RSV and mycoplasma pneumoniae could cause severe bronchiolar damage leading to severe obliterative bronchiolitis in normal infants.

Reprint request : Limudomporn S, Department of Pediatrics, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Received for publication. July 13, 1990.

* Department of Pediatrics, Faculty of Medicine, Chulalongkorn University.

** Department of Radiology, Faculty of Medicine, Chulalongkorn University.

สุภัทรา ลิมอุดมพร, นวลจันทร์ ปราบพาล, ศศิธร ลิขิตนุกูล, วัชรีย์ บัวชุม. หลอดลมฝอยอุดตันเรื้อรังจากเชื้อ
เรสไพราตอรี ซินไซเทียล ไวรัส และ ไมโคพลาสมา นิวโมเนีย : รายงานผู้ป่วย. จุฬาลงกรณ์เวชสาร
2533 ตุลาคม; 34(10) : 781-787

ได้รายงานผู้ป่วยเด็กอายุ 8 เดือน เป็นโรคหลอดลมฝอยอักเสบเฉียบพลัน และมีภาวะหายใจวายจากเชื้อ
respiratory syncytial virus และ *mycoplasma pneumoniae* หลังจากอาการดีขึ้นในระยะแรก ผู้ป่วยมีอาการ
หลอดลมฝอยอุดตันเพิ่มมากขึ้นเรื่อย ๆ จนต้องใช้เครื่องช่วยหายใจใหม่ 4 เดือนต่อมา ลักษณะทางคลินิก ภาพรังสีปอด
และ *ventilation - perfusion lung scan* เข้าได้กับหลอดลมฝอยอุดตันเรื้อรัง (*obliterative bronchiolitis*) ซึ่ง
ไม่ตอบสนองต่อยาขยายหลอดลม และ *corticosteroid* ผู้ป่วยต้องใช้เครื่องช่วยหายใจตลอดเป็นเวลา 9 เดือน
และเสียชีวิตจากภาวะหัวใจวาย เนื่องจากพยาธิสภาพในปอด (*cor-pulmonale*)

Obliterative bronchiolitis, an infrequent chronic form of bronchiolitis, is considered in children who have partial or complete small airway obstruction. It is caused by intraluminal fibrous tissue following severe acute bronchiolitis or any insults to the lower respiratory tract. The common causative organisms include adenovirus, measles, influenzae viruses and bordetella pertussis.⁽¹⁾ Mycoplasma pneumoniae has also been reported as an important etiologic agent.^(2,3) Respiratory syncytial virus (RSV) rarely causes the disease even though it is the most common cause of acute bronchiolitis in infants.^(4,5) The role of concomitant respiratory infections from mycoplasma pneumoniae and RSV leading to obliterative bronchiolitis has not been established. We report a case of obliterative bronchiolitis following mycoplasma pneumoniae and RSV infection in a previously healthy infant.

Case report

An 8 month old female infant was first admitted to the pediatric department, Chulalongkorn Hospital on January 17, 1989 with a two day history of fever, rhinorrhea and cough. She was breastfed and previously healthy until the age of seven months when she developed low grade fever, non-productive cough and generalized erythematous skin rash. All these symptoms spontaneously disappeared within 2 weeks. Physical examination revealed the body weight of 5.8 kg., body temperature of 38.2 celcius, pulse rate 130/minute and respiratory rate 40/minute.

Intercostal and subcostal retractions with diffuse rales and expiratory wheezing on auscultation were noted. At that time, she had a leukocyte count of 13,400/ul with 57% neutrophils and 43% lymphocytes. The arterialized capillary blood gases while she was on 40% oxygen showed pH 7.276, PO₂ 81.1 mmHg., PCO₂ 46.5 mmHg., HCO₃ 21.0 mEq/L. Marked hyperinflation without pulmonary infiltration was noted from her chest X-ray. (Fig.1). Thus, acute bronchiolitis was diagnosed and supportive treatment with intravenous fluid and humidified oxygen were given. Her condition deteriorated despite the treatment with intravenous aminophylline, nebulized salbutamol and hydrocortisone. On the 4th day of admission she developed pulmonary infiltration and respiratory failure requiring mechanical ventilation. Ampicillin 100 mg/kg/day and gentamicin 5 mg/kg/day were administered for possible concomitant bacterial infection. She was weaned off the ventilator 4 days later. Laboratory findings revealed negative hemoculture, positive fluorescent test for RSV from tracheal aspiration and diagnostic serum titers for mycoplasma infection (table 1). Mycoplasma pneumoniae was not cultivated from throat swab culture and neutralizing antibodies for RSV and adenovirus were 1:8 and 1:4 respectively both acute and convalescent titers. The patient received erythromycin to treat mycoplasma infection and her condition continued to improve. She was discharged home on the 20th day with persistent wheezing requiring regular bronchodilator therapy.

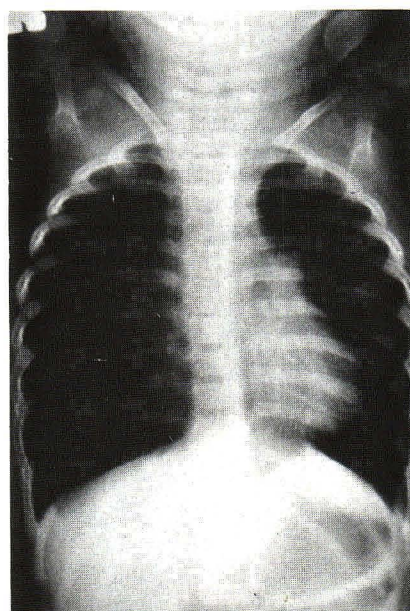


Figure 1. Generalized marked hyperinflation without pulmonary infiltration.

Table 1. Laboratory investigations for mycoplasma infection.

serum	cold agglutinin	complement fixation
Patient		
1 st titer (24/1/89)	< 1 : 8	1 : 512
2 nd titer (3/2/89)	1 : 16	1 : 512
3 rd titer (27/2/89)	1 : 8	1 : 128
Mother (24/1/89)	1 : 8	1 : 8
Father (24/1/89)	1 : 8	< 1 : 8
Grandmother (24/1/89)	< 1 : 8	1 : 8

Four months later, the patient was re-admitted because of fever, cough, dyspnea and mild cyanosis. Chest retraction with respiratory rate of 50/min, generalized rales and wheezing were also noted. Markedly hyperlucent right lung with partial atelectasis of the right upper lobe and both lower lobes were seen on her chest X-ray. Hemoculture and sputum culture were negative for bacteria and fungus. RSV was also negative. She was treated with humidified oxygen, antibiotics, nebulized salbutamol, intravenous aminophylline, corticosteroid and chest physiotherapy for one week without any improvement. She finally developed respiratory failure with carbondioxide retention (P_a CO₂ 40-55 mmHg). Mechanical ventilation was needed to correct respiratory

failure. Since then, she had been ventilator dependent and continued to have several episodes of wheezing and cyanosis. Her radiological chest findings had not changed. (Fig.2) Ventilation perfusion lung scan revealed areas of decreased ventilation and perfusion in the right upper lobe. There was slightly more ventilation defect than perfusion in the lower lobes. (Fig.3,4) These changes were consistent with obliterative bronchiolitis. Prednisolone 2 mg/kg/day was given for 4 weeks with no clinical improvement. The patient's condition deteriorated and developed cor-pulmonale with recurrent nosocomial pneumonia. She finally expired after being on mechanical ventilation for almost 9 month. No autopsy was available.

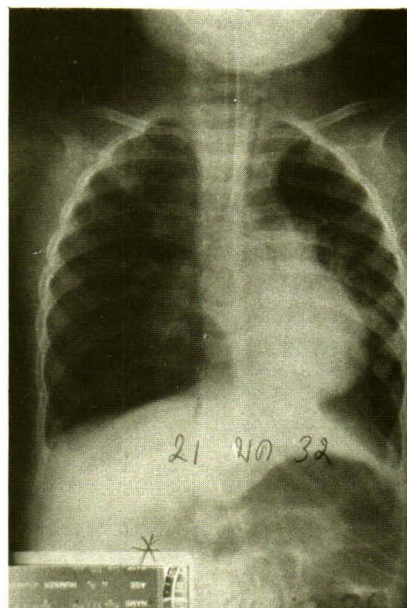


Figure 2. Markedly hyperlucent right lung with atelectasis of right upper lobe and left lower lobe.

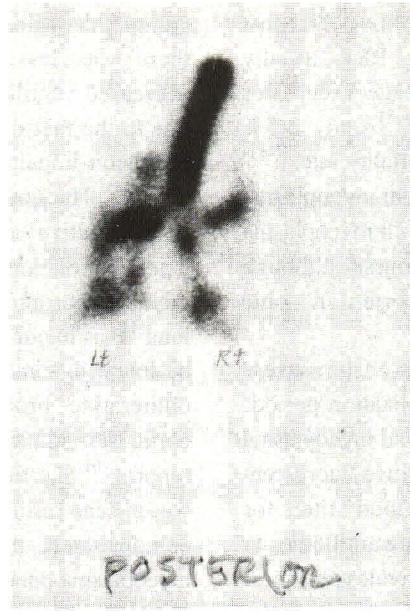


Figure 3. Posterior view of ventilation scan showed diffused ventilation defect, more on the right lung.

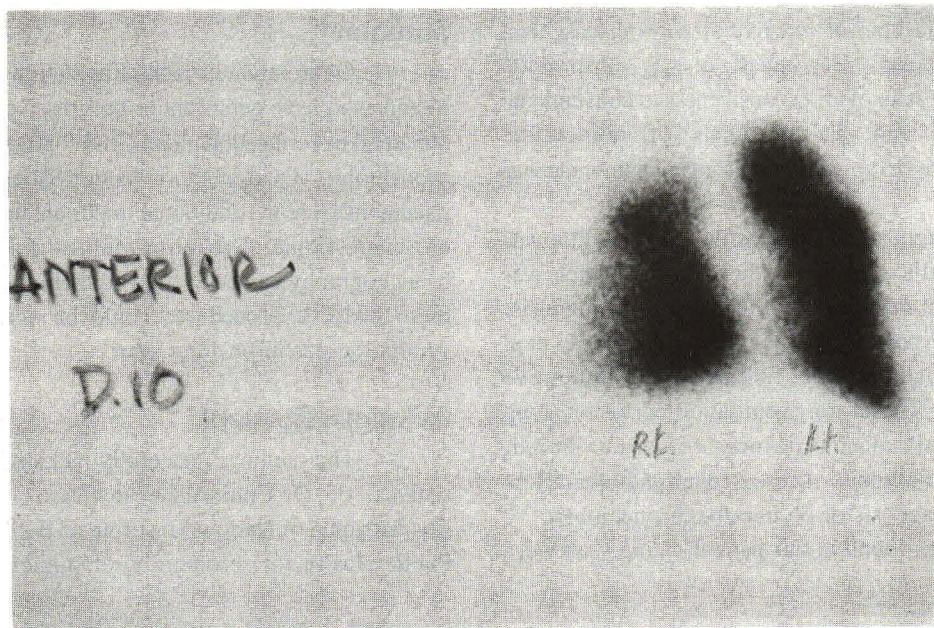


Figure 4. Anterior view of perfusion scan showed perfusion defect in the right upper lobe and mild decreased perfusion in the right lower lobe.

Discussion

Although any insults to lower respiratory tract could lead to obliterative bronchiolitis in which the bronchioles become damaged and obstructed with fibrous

tissues, an incidence of only 1:427 had been reported in pediatric patients.⁽⁶⁾ Respiratory viruses including adenovirus, influenza, parainfluenza and measles viruses were the important causes while RSV was the rare

etiologic agent of obliterative bronchiolitis.^(1,4) Most infants with acute bronchiolitis from RSV usually recovered without permanent lung damage except for those with reactive airways disease.^(4,7,8) Only 2-5% developed respiratory failure with low mortality rate.⁽⁷⁻¹¹⁾ It is the same for respiratory infection from mycoplasma pneumoniae. Previously healthy infants with mycoplasma pneumoniae usually have a benign course although obliterative bronchiolitis had been reported in some cases.^(2,6)

Our patient had respiratory failure from severe acute bronchiolitis during the 1st hospitalization period. The etiologic agents appeared to be RSV and mycoplasma pneumoniae which were confirmed by positive fluorescent test for RSV and a fourfold change in antibody titers for mycoplasma pneumoniae. The neutralizing antibodies to RSV remained 1:8 for both acute and convalescent sera. This might be due to poor antibody response which has been reported in small infants with RSV infections.⁽¹²⁾ As previously emphasized, each infection with RSV or mycoplasma pneumoniae rarely caused respiratory failure in normal infants,⁽¹³⁾ but our case developed respiratory failure due to dual infection from both organisms. However, our patient made an initial recovery followed by persistent wheezing or reactive airways disease as a long term sequelae. Her small airway obstruction progressed to the state of unresponsiveness to conventional bronchodilators and the diagnosis of obliterative bronchiolitis from RSV and mycoplasma pneumoniae was considered.

The diagnosis of obliterative bronchiolitis was usually made pathologically by lung biopsy which was too invasive and did not always confirm the diagnosis. Only 5 out of 12 pediatric cases reported by Hardy et al had positive pathological findings of obliterative bronchiolitis.⁽⁶⁾ Therefore, ventilation-perfusion lung scan, a non-invasive diagnostic measure was introduced. Matched areas of absent or decreased air and blood flow suggested the diagnosis of obliterative bronchiolitis.⁽¹⁴⁾ The abnormalities found in our patient's lung scan were

compatible with obliterative bronchiolitis even though there was less decreased blood flow compared to decreased ventilation in the lower lobes. This might be due to the fact that ventilation impairment preceded the perfusion impairment in obliterative bronchiolitis.

The course of obliterative bronchiolitis varied from reactive airway disease to rapidly progressive deterioration and death.^(2,3,6) Reported complications included chronic atelectasis and unilateral hyperlucent lung⁽¹⁵⁾ as in our patient. In addition, bronchiectasis could be found in some patients.^(15,16) Our patient had severe obliterative bronchiolitis which did not respond to corticosteroid therapy as stated in the majority of previous reports.⁽⁶⁾ She finally expired from cor-pulmonale which was the end result of severe respiratory damage. This case demonstrated that dual infections from RSV and mycoplasma pneumoniae could cause severe lung injuries leading to severe obliterative bronchiolitis in previously healthy infants. Investigations to confirm mycoplasma infection should be performed in infants with severe acute bronchiolitis. The early treatment with erythromycin may prevent permanent lung damage including obliterative bronchiolitis which is the most serious long term sequelae.

Summary

Obliterative bronchiolitis should be suspected in infants who have persistent or progressive wheezing with unilateral hyperlucent lung on CXR following severe acute bronchiolitis. Dual infection from RSV and mycoplasma pneumoniae are the additional important but unusual cause of severe obliterative bronchiolitis. Lung biopsy and bronchography can be used to confirm the diagnosis, but these invasive procedures could be avoided by using ventilation-perfusion lung scan.

Acknowledgement

The authors gratefully acknowledge the assistance of Dr. Chuinrudee Jayavasu and Ms. Pranee Thawatsupha of National Institute of Health, Ministry of Public Health for serologic viral studies.

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