Adult bronchiolitis and parainfluenza type 2

JOHN F. O'REILLY
M.A., M.R.C.P.

Department of Chest Medicine, West Norwich Hospital, Norwich

Summary

A case of acute bronchiolitis in association with parainfluenza type 2 infection is reported in a previously asymptomatic young adult with evidence of partially reversible severe airways obstruction.

Introduction

Parainfluenza type 2 is well recognized as an upper respiratory pathogen but has not previously been associated with disease of the lower airways in adults. Acute bronchiolitis, although common in infants, is a rare disease in adults and little is known of its patho-physiology or sequelae.

Case report

A 22-year-old Australian man presented with a 7-day history of dry cough with subsequent severe progressive dyspnoea, bilateral pleuritic chest pain and expectoration of blood-stained sputum, with no response to co-trimoxazole. There was no previous history of chest disease although he had smoked 15 cigarettes daily for several years. On examination he was afebrile, confused, centrally cyanosed and tachypnoeic, with indrawn intercostal spaces on inspiration, widespread bilateral crepitations and sinus tachycardia 120/min with 15 mm systolic paradox. Chest X-ray showed hyperinflation with subcutaneous emphysema in the neck, but no evidence of consolidation. A blood count revealed marked neutrophilia 93% of $25.5 \times 10^9/l$. Sputum culture grew parainfluenza type 2 virus but no bacteria. A throat swab and blood cultures produce no growth. Complement fixation titres to *Mycoplasma*, influenza A and B, respiratory syncytial virus and *Legionella pneumophila* were insignificant. Serial blood gas analysis showed evidence of marked alveolar hypoventilation with hypoxia (Table 1). Despite treatment with continuous oxygen, physiotherapy and ampicillin, cloxacillin and gentamicin, his condition had deteriorated after 24 hr. A diagnosis of bronchiolitis was then made and additional treatment begun with i.v. aminophylline and hydrocortisone, and nebulized salbutamol

inhalation. A rapid fall in Pa_{CO_2} accompanied clinical improvement (Table 1), with progressive recovery over 2 weeks, after which his chest X-ray had returned to normal. Two months later he remained slightly breathless on exertion with FEV₁ 2.95 litres (predicted normal (p.n.) 4.25 ± 0.5 litres) and FVC 4.7 litres (p.n. 5.05 ± 0.58 litres). Following full symptomatic recovery at 3 months he showed evidence of irreversible small airways narrowing with FEV₁ 3.26 litres, FEV₁/FVC 67% (p.n. $78 \pm 7.2\%$) and maximum expiratory flows at 50% (MEF₅₀) and at 25% (MEF₂₅) vital capacity of 2.6 litres/sec (p.n. 5.1 ± 1.1 litres/sec) and 0.71 litre/sec (p.n. 2.0 ± 0.8 litres/sec) without significant change after salbutamol inhalation. DL_{CO} was 31.75 ml/min/mmHg (p.n. 33.45 ml/min/mmHg) with KCO 4.15 ml/min/mmHg. Residual volume was 1.39 litres (p.n. 1.85 litres) with total lung capacity 6.78 litres (p.n. 7.2 litres).

TABLE 1. Blood gas analysis showing progressive recovery from respiratory failure

Day	Pa_{O_2} (kPa)	Pa_{CO_2} (kPa)	pH	fiO ₂
0	5.8	7.9	7.32	24%
1	7.2	11.1	7.25	35%
2	8.5	6.4	7.47	40%
3	9.4	5.2	7.50	40%
10	5.0	5.9	7.44	Air
20	8.9	5.4	7.41	Air

Discussion

Acute viral bronchiolitis is a rare disease in older children and adults, having been reported in association with measles, influenza, and rhinovirus infections, and is seldom diagnosed clinically (Wohl and Chernik, 1978). It may be distinguished from bronchitis of the larger airways by greater severity of symptoms, with more marked dyspnoea and tachypnoea, inspiratory recession of soft parts of the chest and often cyanosis. Auscultation reveals expiratory rhonchi and rales. Chest X-ray appearances range from normal to hyperinflation with air-trapping or pneumonia. Pathologically, submucosal

oedema and fibrin plug formation in small bronchi and bronchioles has been demonstrated, producing partial or complete obstruction. In infants, in whom respiratory syncytial virus and parainfluenza viruses commonly cause bronchiolitis, the physiological basis for respiratory difficulty is small airways narrowing with reduced dynamic compliance, and increased thoracic gas volume and expiratory resistance (Phelan, Williams and Freeman, 1968). Gas exchange is impaired with reduced P_{a,O_2} secondary to reduced ventilation-perfusion ratios, and in severe cases CO_2 retention. There are few data available from adults. In this age group parainfluenza virus usually produces a mild upper respiratory infection with rhinorrhoea, headache, fever and malaise.

The mainstay of treatment in viral bronchiolitis is oxygen and supportive measures. The response to bronchodilators has not been adequately assessed (Wohl and Chernik, 1978), but in infants is considered of no value (Phelan and Williams, 1969). The patient described, however, responded dramatically to bronchodilator therapy. This may reflect differences in childhood and adult pulmonary physiology.

The sequelae of viral bronchiolitis in childhood include abnormal P_{a,O_2} , FEV_1 , and MEF_{25} , even in the absence of symptoms, indicating a residual

parenchymal or airways lesion (Kattan *et al.*, 1977). Little is known of the sequelae of adult bronchiolitis although chronic obstructive airways disease has been reported (Dines, 1967).

The patient described showed physiological evidence of irreversible small airways narrowing 3 months after his acute illness. At his age, with his smoking experience, this airway narrowing is more likely to be caused by viral bronchiolitis than by cigarettes.

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