CHICKENPOX PNEUMONIA A CASE REPORT

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SYNOPSIS

A 39 year old Chinese male presented on 8/4/84 with fever, cough and dyspnoea. On examination he had cyanosis, conjuntivitis and typical chickenpox skin lesions. Temperature 39 °C, pluse 140/min, respiration 40/min, BP 130/80. There were crepitations in both lungs. Heart sounds were normal. There was polymorphonuclear leucocytosis. Chest x-ray was compatible with fulminating pneumonia and adult respiratory distress syndrome. ECG was normal. Blood gases showed hypoxia with hyperventilation. He was managed with PEEP, CPAP, antibiotics, acyclovir, hydrocortisone, lasix and cimetidine. The complications were surgical emphysema and stress ulcer. His condition improved on the 4th day. Lung function test revealed a restrictive picture. He is followed up for pulmonary calcification.

INTRODUCTION

Chickenpox in adults is usually severe and 15% (1) of cases develop pneumonia, It may be complicated by ARDS (2,3,4,). A mortality rate of 20% has been reported. This case is reported to illustrate (A) the clinical features of chickenpox pneumonia complicated by ARDS and (B) how PEEP and CPAP improve the prognosis.

CASE REPORT

A 39 year old Chinese male, manager of an electrical goods company presented on 8/4/84 with dyspnoea, cough, fever and cyanosis. He was exposed to chickenpox 2-3 weeks ago when his daughter suffered from chickenpox. There was no past history of note. He smoked 20 cigarettes per day for 20 years.

History of present illness. On 4/4/84 he noticed papules, vesicles and slight fever. On 5/4/84 he had a dry cough. There was no haemoptysis or chest pain. On 7/4/84 he was breathless and was admitted to Middleton Hospital. However at 8.00 pm on 8/4/84 he became very dyspnoeic and cyanosed and was transferred to Tan Tock Seng Hospital for management. Examination revealed a very ill, febrile, confused and dyspnoeic man with chickenpox rash and conjunctivitis. There was no haemorrhagic or pustular lesions. The rashes were very scanty and mostly scabing. He was tachypnoeic with a respiratory rate of 40/min, temperature 39°C. There was no anaemia, jaundice, clubbing or lymphadenopathy. The cardiovascular system was normal, except for tachycardia. BP 130/80. There was vesicular breath sounds with crepitations in both lungs. Abdomen and nervous system were normal. Investigations: Blood gases (Table I) showed hypoxia with hyperventilation. Chest x-ray (Fig 1) showed air space shadowing in both lungs with air bronchogram, compatible with fulminating pneumonia. Haemoglobin 13gm/dl, total while cell count 14,000/cm^3, polymorph 90% with shift to the left. Platelets 250,000/cm^3, ESR 73mm after one hour. Serum estimation revealed normal urea, electrolytes, creatinine, sugar and bilirubin. Blood immunoglobulins were normal. The alkaline phosphatase was 164 units/L SGPT 128 units/L. Blood cultures were negative. Complement fixation antibodies for mycoplasma, influenza A and B, adenovirus and psitacosis were negative. Stools for occult blood was positive on the 7th day. Lung function test done after 3 weeks (Table 2) showed a restrictive picture. picture.

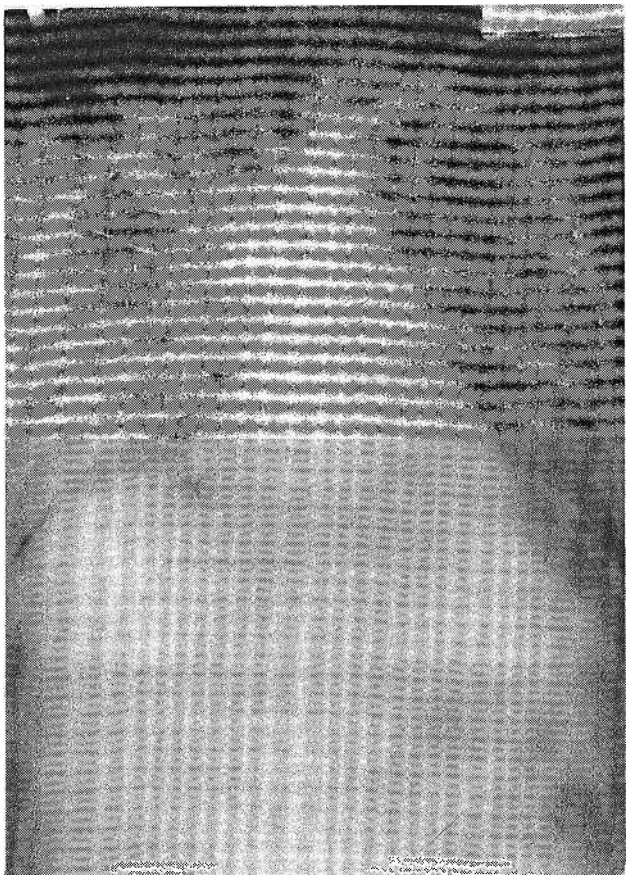

Fig. I Chest x-ray on admission

TABLE I — Blood Gases

Date	pH	PaO2 mm Hg	PaCO2 mm Hg	Bicarbonate	Sa 02%	Remarks
8/4/84	7.4	45	20	25	84.4	On room air
	7.3	73	32	19.3	94	Mark 8 respirator 80% 02.
	7.4	45	34	25	80	Compatible with ARDS.
9/4/84	7.4	96.5	34	26	97	PEEP + 10 cm water 70% 02
10/4/84	7.4	77	35	25	95	CPAP + 10 cm water 60% 02 with IMV
19/4/84	7.4	80	36	22.7	94	On room air.

Management. For blood gases see Table I. He was intubated and put on Mark 8 respirator with 100% oxygen which was reduced to 80%. As satisfactory blood gases could not be maintained he was put on Bennett MA-2 volume cycled with PEEP. However, as he developed mediastinal and surgical emphysema on PEEP, CPAP with IMV was used. He improved steadily and was extubated on the 4th day of admission. Ampicillin, cloxacillin, gentamycin, anti-viral agent acyclovir, hydrocortisone, lasix and cimetidine were given. Conjunctivitis was treated with normal saline eye wash. Progress. He developed stress ulcer with malena on the 3rd day, crepitations in the lungs cleared on the 4th day and surgical emphysema was not detectable on the 6th day. The chest x-ray showed remarkable clearing (Fig 2). It showed well defined reticulonodular shadows evenly distributed throughout both lungs. He is followed up to detect pulmonary calcification.

Table 2 — Lung function test 3 weeks after admission

	Predicted	Results
FEV_1 (L. BTPS)	3.22	3.24
FVC (L. BTPS)	3.74	3.66
FEVI FVC%	70	89.2
TLC (L. BTPS)	5.48	4.46
FRC (L. BTPS)	2.97	1.84
RV (L. BTPS)	1.68	0.82
MMFR (L. BTPS)	3.84	4.97
DCO	27.6	20.4
ml/min/mmHg		3 months later

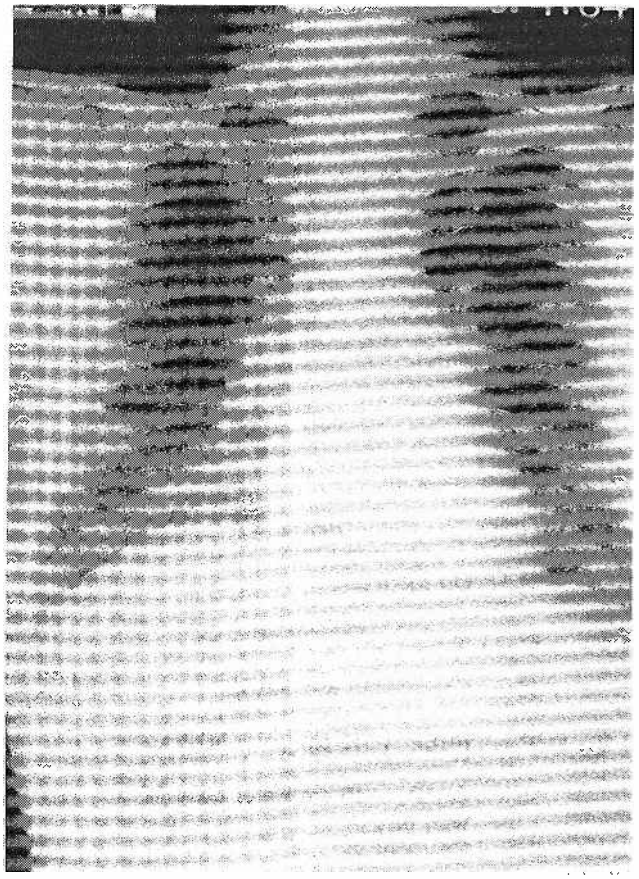

Fig 2 Chest x-ray 3 weeks after admission

DISCUSSION

Chickenpox in adults is often more severe than children with a greater incidence of pneumonia (5). Of adults with chickenpox 15 percent develop primary varicella pneumonia (1).

Pathology. There are varying sizes of parenchymal necrosis. Lesions are present on the tracheal mucosa and pleural surface. Microscopic examination shows infiltration with macrophages, lymphocytes and polymorph. The alveolar walls are congested and there is swelling and desquamation of the septal cells. Secondary infection is rare though the use of mechanical ventilators increase the risk (5,6).

Clinical features include tachypnoea, dyspnoea, cough, fever, cyanosis, pleuritic pain, haemoptysis (2,5) shock and hypotension (6,7). Pneumonia is invariably associated with skin lesions and appear 1-6 days after onset of rash (l). The clinical spectrum of disease varies from virtually asymptomatic patient to the severely ill one. The degree of pulmonary involvement does not correlate with the severity of the rash (5) as seen in this case. The following pulmonary manefestations have been reported pneumonia (1,2,5,6,7), pleural effusion (1,5) haemothorax (8), spontaneous subcutaneous emphysema (7), ARDS (2,3,4) and radiological evidence of pulmonary calcifications (9,10). Spontaneous subcutaneous emphysema has been described in chickenpox, measles, and smallpox. The pathogenesis of mediastinal emphysema and subcutaneous emphysema is due to extensive pulmonary infiltration probably associated with a compensatory over inflation of the remaining lung alveoli. The result is a pneumomediastinum and subcutaneous emphysema at the root of the neck (1). Surgical emphysema in this case is due to PEEP.

Chickenpox pneumonia is one of the conditions which can lead to adult respiratory distress syndrome. Injury to the alveolar capillary membrane results in leakage of fluid into the interstitial space and alveoli, causing progressive oedema and alveolar collapse with atelectasis which may result in severe ventilation/perfusion mismatching and diffusion impairment. Radiological changes consist of nodular infiltration of both lungs which usually resolve within 8 weeks (2), but in some cases persistent miliary calcification may follow 2-7 years later (9,10).

Lung function — Ventilation/perfusion abnormalities and reduction in transfer of carbon monoxide are probably common in varicella pneumonia (12). Lung function returns to normal with x-ray clearing but persistent abnormality of pulmonary gas diffusion has been demonstrated several months after recovery (1). Mild to moderate degree of restrictive ventilatory defect with hyper-reactivity of airway are sequela of ARDS (13). Hepatitis is a common complication of chickenpox (7). In this case the raised transaminase and alkaline phosphatase suggest hepatitis. Conjunctivitis was due to viraemia.

Management. The timely introduction of CPAP and PEEP prevent further atelectasis and decrease shunting. This alters the natural course of the disease (2). As the patient was very ill broad spectrum antibiotics and acyclovir were used. The

role of acyclovir in fulminating varicella pneumonia occurring in a patient with normal immune system remains to be determined. To our knowledge there has been only one case report where acyclovir was administered for fulminating chickenpox pneumonia in a normal patient (14). The results were impressive in that case. There is no evidence that corticosteroids are beneficial in the management of ARDS and varicella pneumonia. Radiological calcification may be detected 2-7 years later.

REFERENCE

1. Harrison's Principles of internal medicine. Macgraw Hill, 1980 : 801-3.
2. Pillans P S : Chickenpox pneumonia. S Afr Med J 1983; 63 : 861-2.
3. Hopewell P C, Murray J F : The adult respiratory distress syndrome. Ann Rev Med 1976; 27: 343-9.
4. Petty T L, Ashbaugh D G : The adult respiratory distress syndrome. Chest 1971; 60 : 233-9.
5. Triebwasser J H et al : Varicella pneumonia in adults. Medicine 1967; 46 : 409-14.
6. Knyvett A F : The pulmonary lesions of chickenpox. Q J Med 1966; 35 : 313-23.
7. Krugman S et al ; Primary varicella pneumonia. N Eng J Med 1957; 257 : 843-8.
8. Gupta P K et al : Haemothorax complicating varicella infection. J Ass. Physicians India 1982; 2 : 115-6.
9. Abrahim E W et al : Varicella pneumonia possible cause of subsequent pulmonary calcification. Med J Au 1964, 2 : 781-2.
10. Raider L : Calcification in chickenpox pneumonia. Chest 1971; 60 : 504-7.
11. Macklin T M, Macklin C C : Malignant interstitial emphysema of lungs and mediastinum. Medicine 1944; 23 : 181-6.
12. Hinshaw-Murray : Diseases of chest. Saunders 1979; 241-2.
13. Simpson D I et al : Long term follow up of adult respiratory distress syndrome survivors. AM Rev Resp Dis. 1978; 117 : 449-54.
14. Van Der Meer JWM et al : Treatment of chickenpox pneumonia with acyclovir. Lancet 1980; 2 : 473-4.