

# ESCHERICHIA COLI LUNG ABSCESS IN A YOUNG ADULT

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## SYNOPSIS

**A previously healthy young adult male presented with fever and cough productive of purulent sputum. His chest x-ray revealed a large cavitating pneumonia with fluid level in the left lower lobe and sputum cultures repeatedly grew E. Coli. He had been a heavy smoker for several years and this might have been a significant contributory factor in the development of his lung abscess.**

## INTRODUCTION

E. coli lung abscess and pneumonia are rare and occurs predominantly in debilitated, immunocompromised or the elderly. Often it arises as a result of metastatic seedling from a primary site in the genito-urinary or the gastro-intestinal system. Though aspiration from the oropharynx could occur, it is uncommon. The present case is of interest as E. coli lung abscess developed in a young man with no apparent pre-disposing factors.

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**CASE REPORT**

27 year old quality surveyor was admitted on 12.3.85 with complaints of fever with chills for about one month and weight loss of 30 lbs. over the same period, and cough productive of thick purulent sputum for 3 days prior to admission. He had been completely well prior to his present illness. There was no past history of diabetes mellitus, pulmonary tuberculosis or chronic respiratory illness, or UTI. He does not take liquor, but had been smoking 30 cigarettes per day for the past 12 years.

On clinical examination he was febrile (temp. 38.5°C) and toxic. His pulse rate was 120/min. and blood pressure was 140/90 mmHg. Auscultation of the heart revealed a functional systolic murmur grade 2/6 at the left sternal edge. Significant findings in the respiratory system were decreased air entry, diminished percussion note and inspiratory crepitations at the left base.

Laboratory investigations showed a haemoglobin of 7.3 g% and a leucocytosis of 24,000 with 97% polymorphs. Chest radiograph revealed a large thick walled cavity with fluid level, involving the left mid and lower zones (Fig. 1 and 2). Sputum smears for acid fast bacilli were negative, and sputum cultures grew *E. coli* on 3 occasions and was sensitive to Gentamycin and Cephalosporins. Blood cultures grew no organisms, urine microscopy was normal and urine culture was negative. Ventilatory function tests showed a FEV<sub>1</sub>%

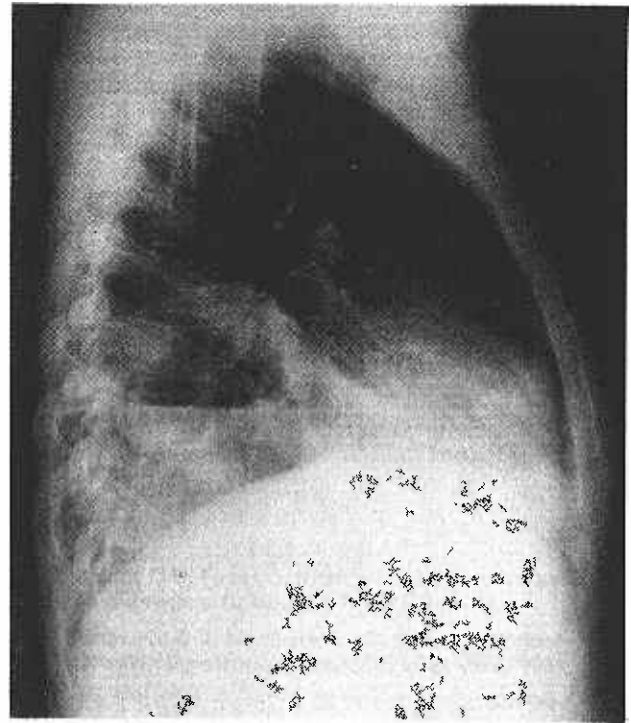


Fig 2 — Left lateral view showing an abscess

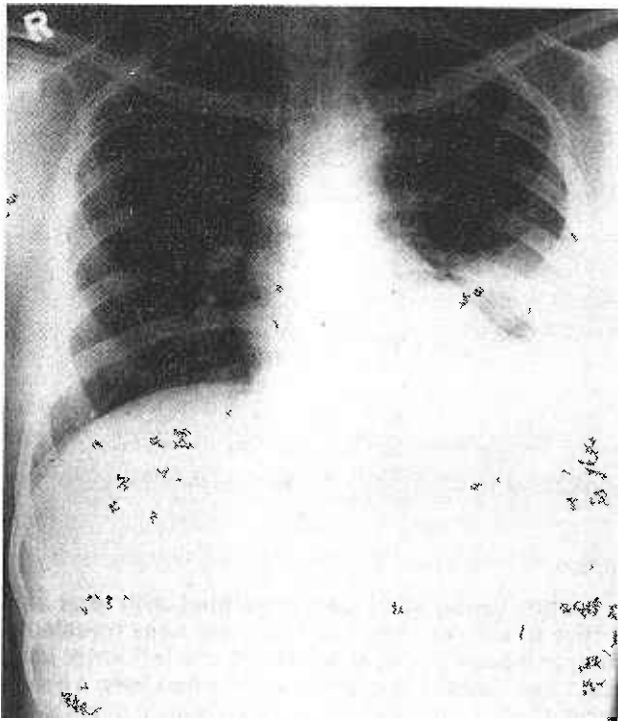


Fig 1 — PA view showing a lung abscess in the left lower lobe

of 84. Arterial blood gases breathing air, pH 7.40, PCO<sub>2</sub> 36.8 mmHg., PaO<sub>2</sub> 96.6 mmHg., O<sub>2</sub> saturation 96.8%, HCO<sub>3</sub> 23.5 mEq/L. Blood urea was 10 mg% and random blood sugar was 127 mg%. Serum iron and total iron binding capacity were decreased (28 ug/dl and 154 ug/dl respectively). Serum folate was diminished (2.5 ug/L). Examination of the stools showed no ova or occult blood. Liver function tests showed a low serum albumin of 2.3 gm/L and a raised alkaline phosphatase of 310 U/L. The transaminases were marginally elevated. The liver scan was normal. Serum immunoglobulins were within limits (IgG 1975 mg/L, IgA 454 mg/L, IgM 116 mg/L) and the serum complement was normal.

**DISCUSSION**

Lower respiratory tract infections by gram negative bacilli commonly results from haematogenous spread from an extrapulmonary focus. The genito-urinary and the gastro-intestinal systems are predominant sources of gram negative pathogens. Pneumonia, lung abscess or empyema may also arise as a result of aspiration of these organisms from the oropharynx.

In a normal healthy person, gram negative bacteria present only in small numbers in the oropharynx, constituting about 2% of the pharyngeal flora (1). A much higher percentage of 11.5 and 18.0 were reported by Rahal (2) and Rosenthal (3) respectively in their study. The ecosystem in the oropharynx may be dramatically and significantly altered when defence mechanisms,

which normally ensure a stable environment, are impaired. The lapse in protection results in enhanced adherence by the gram negative bacilli to the mucosal epithelial cells (4), which is a necessary pre-requisite for subsequent lower respiratory tract infection by aspiration. There is a higher prevalence of oropharyngeal colonization by gram negative bacilli among the elderly, especially those who are chronically ill or institutionalized. In a survey of 405 elderly admitted to an acute hospital ward Valenti et al (5) found gram negative organism in 60% (Klebsiella 41%, E. coli 24%, Enterobacter in 14% of those with colonization). Increased colonization has also been shown to occur during viral infection as compared to illness free periods (6).

The present case is unusual as community acquired E. coli abscess developed in an apparently healthy young man. Though one may dispute that sputum culture may not be truly reflective of the organism responsible for lower respiratory tract infection, in this instance sputum revealed significant numbers of gram negative bacilli, and E. coli was grown in consecutive sputum cultures and hence lung abscess is most likely due to Escherichia Coli.

In the absence of common pre-disposing factors it is felt that heavy smoking may have been a contributory cause. There is strong epidemiological data (7, 8, 9) to show significant association between cigarette consumption and respiratory tract infections. Acrolein (10) an aldehyde component of cigarette smoke has been shown to impair pulmonary defence mechanisms and pre-dispose to bacterial infections in animal experiments. Concomittant viral illness appeared to enhance the deleterious effects of acrolein. Increased bacterial adherence to buccal mucosal cells, the critical factor pre-disposing to pulmonary infection from aspiration, has been well demonstrated in human volunteers (11, 12). The enhanced affinity in smokers reaches its optimum within few years of smoking, does not appear to vary with age, and persist up to 14 weeks after cessation. The increased adherence is believed to be due to a substance in the cell free filtrate of the smoker's saliva (12).

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