

## A Case of Lung Abscess due to Anaerobic Bacterium “*Vibrio succinogenes*”

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**Abstract :** It is difficult to decide the anaerobic bacteria isolated from sputum as pathogen. Therefore the detecting of anaerobic organisms by use of the materials in transbronchial aspiration is useful to decide them as significant pathogens. We reported here a case of lung abscess, in which anaerobic bacterium “*Vibrio succinogenes*” was isolated from the material obtained by transbronchial aspiration. The Lincomycin treatment was effective in the course of the disease.

### INTRODUCTION

In respiratory infection, anaerobic bacteria occur with high frequency in lung abscesses (Bartlett and Finegold, 1971, 1974; Shafron and Tate, 1968; Perlman, Lerner and D'Esop, 1969). But, these bacteria can exist as normal flora in the oral cavity (Gonzales and Calia, 1975; Ribaud and Crace, 1971). Therefore, it is difficult to decide the anaerobic bacteria isolated from sputum as pathogen. We report here a case of lung abscess, from which anaerobic bacteria were detected by transbronchial aspiration and was cured by treatment with Lincomycin.

### CASE REPORT

The patient was a 60-year-old man, a day laborer. He had a history of pleuritis 17 years ago. He drinks alcohol (2 cups of sake) every day. His family history was not

noteworthy. He was hospitalized because of a fever, a cough, and an abnormal shadow in the radiograph of the left lung. Two weeks before hospitalization, because he had a fever of 38–39°C for three days, he visited the out-patient department of Goto Central Hospital. His cough became worse, but he had no symptoms of chest pain or dyspnea. He was not treated with antibiotics until hospitalization. He was sent to the 2nd Department of Internal Medicine, Nagasaki University Hospital for further examination and treatment. On admission to Nagasaki University Hospital, physical examination revealed: height 165cm, weight 45.5 kg, pulse 96/min., blood pressure 120/70mmHg, clubbed finger, no lymphadenopathy, no anemia and no jaundice. Heart sound was clear. The left upper lung was dull to percussion and vocal resonance was decreased. He had decreased breath sound on the left upper zone, but no rales was audible. The abdomen was flat with a soft wall. Liver was palpable, 2fb at the costal margin, its edge was sharp and there was no tenderness. There was no abnormality in the neurological examination. Marked inflammatory findings were demonstrated in laboratory examination on admission; i.e., WBC 14,600/mm<sup>3</sup> (St. 4%, Seg. 73%, Lym. 19%, Eo. 3%), total protein 7.29g/dl (Al. 34.6%,  $\alpha_1$  9.3%,  $\alpha_2$  17.8%,  $\beta$  13.1%,  $\gamma$  25.0%), CRP (6+), ESR 110mm/hour. Mantoux reaction was negative, electrolytes and urinalysis were normal. The posteroanterior chest radiography, Fig. 1, showed a dense infiltration in the left upper lobe; left decubitus chest radiograph demonstrated an air-fluid level in the cavity.

On admission his body temperature was normal and his general condition was relatively good. Consecutive blood cultures were negative. No specific pathogenic organisms were found in the expectorated sputum on admission.

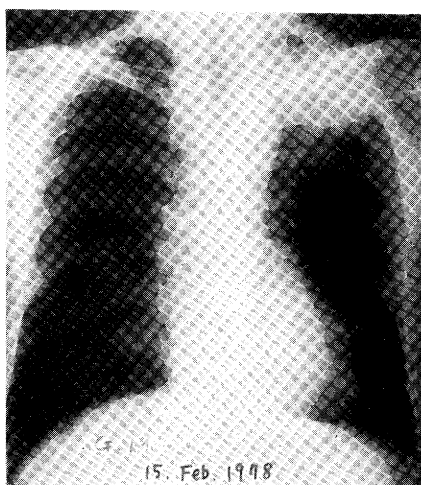


Fig. 1. Chest roentgenogram on admission shows a dense infiltration with a cavity accompanied by an air-fluid level in the left upper lobe. (15 Feb., 1978)

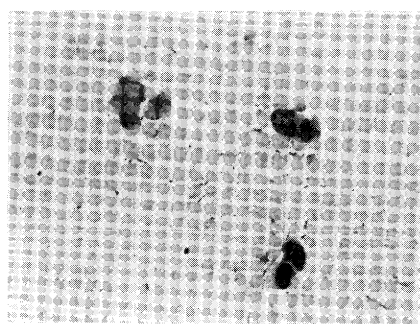


Fig. 2. Microscopic examination shows many gram-negative rods in transbronchial aspirate.

A small amount of *Haemophilus influenzae* was discovered in the sputum the 2nd and 5th day after admission. Bacteria in the sputum 6 day after admission were normal flora. On the seventh day after hospitalization, a catheter was inserted transbronchially into abscess cavity of S<sup>1+2</sup> by using fluoroscopy. Putrid pus was aspirated from that site. After aspiration, he was treated with T-1551, a newly developed cephalosporin derivative, at a dose of 1 g by intravenous drip infusion every 12 hours.

Fig. 2 shows a gram-stained preparation of transbronchially aspirated putrid pus. Many gram-negative rods are seen. Aerobic culture of the aspirate had no growth. But, anaerobic culture demonstrated a few of gram-positive cocci and many gram-negative rods. The former was *Peptococcus morbillorum* and the latter *Vibrio succinogenes*. *Vibrio succinogenes* was identified by Prof. K. Ueno, Gifu University School of Medicine, and its biological characteristics are written in Table 1.

Five days after admission, the patient developed a fever of 38°C with chills and productive cough. These symptoms persisted even though T-1551 had been given. According to laboratory findings, inflammation (ESR, CRP, leukocytosis, mucoprotein) increased. Chest radiograph showed increased left upper lobe infiltration (Fig. 3). Then, T-1551 was changed to Lincomycin (LCM) at a dose of 3 g by intravenous drip infusion for 2 weeks. At the end of that time, 4 weeks after admission, ESR had decreased to 60mm/hour, WBC count to 8,200/mm<sup>3</sup> and CRP from six plus to one. In the chest radiograph, the infiltration became smaller in size. At this time, Lincomycin was changed to Metronidazole, which is said to be also effective against anaerobic organisms. Clinical symptoms, blood and biochemical finding were further improved. Fig. 4 is a chest radiograph taken 6 weeks after admission.

On May 8th, 1978, he was discharged.

Table 1. Biological characteristics of isolated bacterium

Identified name: <i>Vibrio succinogenes</i>			
Gram-negative rod			
Formic acid and fumaric acid accelerate its growth,			
It makes succinic acid from fumaric acid			
H <sub>2</sub> S	(+)	Mannite	(-)
Esculin PH	(-)	Rhamnose	(-)
Esculin hydrolysis	(-)	Sorbitol	(-)
Fructose	(-)	Salicin	(-)
Glucose	(-)	Sucrose	(-)
Glycerol	(-)	Melezitose	(-)
Glycogen	(-)	Indol	(-)
Lactose	(-)	Nitrates reduction	(-)
Growth at medium containing bile acid			(-)



Fig. 3. Chest roentgenogram after T-1551 treatment shows enlarged left upper lobe infiltration. Cavity with an air-fluid level became larger. (1 March, 1978)



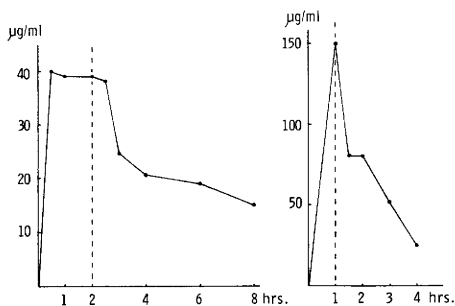
Fig. 4. Chest roentgenogram after LCM treatment shows improvement of the left upper lesion.

DISCUSSION

Beerns *et al.* did percutaneous puncture of 39 cases of lung abscess, anaerobically cultured the aspirated pus, and discovered anaerobic bacteria in 22 out of 33 cases (67 per cent). This proved that anaerobic bacteria were occurring with high frequency in lung abscesses. In our case, we simultaneously detected *Vibrio succinogenes* and *Peptococcus morbillorum* from the abscess by transbronchial aspiration. In the antibiotics sensitivity test using the three disc method, these organisms were highly sensitive to cephalosporins (Table 2).

Minimum inhibitory concentrations (MICs) of several antibiotics against the two recovered bacteria and serum levels of used drugs are shown in Fig. 5 MIC of T-1551 against *Vibrio succinogenes* was 100µg/ml and that of Lincomycin was 25µg/ml. The serum level of Lincomycin at a dose of 3 g by intravenous drip infusion for 2 hours was 30–40µg/ml during drip infusion

a) Blood Levels of Lincomycin after Drip Infusion (LCM 3g for 2 hrs.)      b) Blood Levels of T-1551 after Drip Infusion (T-1551 1g for 1 hour)



c) Drug Sensitivity of Bacteria isolated (MIC: µg/ml)

	CP	DOTC	LCM	T-1551
<i>Vibrio succinogenes</i>	6.25	3.13	25	100
<i>Peptococcus morbillorum</i>	1.56	0.10	3.13	6.25

Fig. 5. Blood levels of drugs used.

Table 2. The results of bacterial examination

## a) Bacterial examination

Date	Material	Culture
16, Feb. '78	Sputum	<i>H. influenzae</i> (a few)
19	Sputum	<i>H. influenzae</i> (a few)
20	Sputum	Normal flora
21	Bronchial aspiration	<i>Peptococcus morbillorum</i> (a few) <i>Vibrio succinogenes</i> (+++)
22	Sputum	Normal flora

## b) Drug sensitivity (Disc method)

Antibiotics	1*	2*	Antibiotics	1*	2*
PC-G	(+++)	(+++)	CER	(+++)	(+++)
EM	(+++)	(+++)	CET	(+++)	(+++)
JM	(+++)	(+++)	CEX	(+++)	(+++)
LCM	(+++)	(+++)	CEZ	(+++)	(+++)
CP	(+++)	(+++)	ABPC	(+++)	(+++)
TC	(+++)	(+++)	MCI-PC	(+++)	(-)
MINO	(+++)	(+++)	CBPC	(+++)	(+++)
KM	(+)	(-)	SBPC	(+++)	(+++)
GM	(+)	(-)	NA	(-)	(+)
DKB	(+)	(-)	SMX-TMP	(-)	(+)
CLM	(+++)	(+++)			

\*1: *Peptococcus morbillorum*\*2: *Vibrio succinogenes*

and was 15 $\mu$ g/ml 6 hours after the end of drip infusion. Because of good penetration of Lincomycin into the lung, not only *Peptococcus morbillorum* (MIC 3.13  $\mu$ g/ml) but also *Vibrio succinogenes* (MIC 25 $\mu$ g/ml) seemed to be inhibited by Lincomycin.

In respiratory infections, sputum is generally used for detection of pathogenic bacteria. But, because many anaerobic bacteria exist in the oral cavity, anaerobic culture of sputum is not useful for examination. But anaerobic bacteria are considered to frequently cause lung abscess. Therefore transbronchial aspiration (Bartlett, 1977; Hahn and Beaty, 1970; Ries, Levison and Keye, 1974) for detecting anaerobes and the proper choice of antianaerobic drugs are necessary when penicillins, cephalosporins and aminoglycosides are ineffective in treating lung abscess.

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嫌気性菌 *Vibrio succinogenes* による肺化膿症の一例

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喀出痰より分離された嫌気性菌を病原体と確定することは, 口腔内常在菌の混入の可能性もあり, 困難なことが多い. しかし一方, 経気管支的に採取された材料より嫌気性菌を検出した場合は, それらを病原菌と決定することができる.

われわれは嫌気性の *Vibrio succinogenes* によると思われる60歳男子の肺化膿症の1例を報告した. 診断は気管支鏡を用いて病巣局所より得られた吸引材料から本菌を検出することでなされ, リンコマイシン点滴静注によって治癒せしめえた.

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