**Klebsiella Pneumoniae-Induced Mycotic Aneurysm
of the Abdominal Aorta Complicated
by Bloody Pleural Effusion
— A Case Report —**

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A 68-year-old diabetic male who suffered from recurrent severe lumbago and high fever was found to have mycotic abdominal aneurysm. His symptoms did not improve after maximum-dose antibiotic therapy. Bloody pleural effusion on the left side was noticed hours before he expired. *Klebsiella pneumoniae* alone was isolated from blood from cellulitis-related bacteremia, when aneurysm formation was complete and later from bloody pleural effusion. To our knowledge, this is the first report of mycotic abdominal aneurysm of solely *Klebsiella pneumoniae* complicated by bloody pleural effusion.

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THE Although the incidence of mycotic aneurysm has decreased with the proliferation of antibiotic therapy, this disease is still encountered occasionally and constitutes 0.8% to 2.5% of all aortic aneurysms.^{1,2} Retroperitoneal mycotic aneurysm chiefly presents with high fever, leucocytosis and symptoms of retroperitoneal irritation such as abdominal and/or back discomfort which might be misdiagnosed as acute pancreatitis or pyelonephritis. Rupture of mycotic aneurysm causing pleural effusion is rare and is associated with a high mortality rate. We report here an unusual case of *Klebsiella pneumoniae*-induced mycotic aneurysm of the abdominal aorta, which eventually ruptured to cause bloody pleural effusion.

Key words:

Mycotic aneurysm
Bloody pleural effusion
Klebsiella pneumoniae

CASE REPORT

A 68-year-old Chinese male was admitted to Tzu Chi Hospital on February 12, 1995, after having suffered from severe lumbago and fever for 10 days. He was diabetic with poor blood-sugar control (HbA1c=8.3%). Upon admission to the surgical department, he complained of swelling, redness and pain in this left thigh accompanied by high fever since January 24, 1995. *Klebsiella pneumoniae* was found in a blood culture. After antibiotic therapy (Cephadrine, Amikacin) for 7 days, symptoms subsided and he was discharged on January 31. On February 2, he developed a severe sharp pain in the left lumbar area radiating to the upper back accompanied by a high fever and chill which lasted for several hours and subsided spontaneously. Thereafter, these symptoms occurred intermittently. He had no history of hypertension.

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Fig 1. Chest roentgenograms on admission (A) and hours before the patient died (B).
 (A) clear lung fields and normal mediastinum.
 (B) massive pleural effusion (arrow) in the left lung field.

Fig 2. (A) Contrast CT showing pseudoaneurysm (AN) surrounded by a thickened low-density layer with an unclear margin.
 (B) Aortogram revealing pseudoaneurysm (AN) on the left side of the abdominal aorta (AA).

Physical examination revealed that he was 155 cm tall and weighed 49.2 kg. Pulse rate was 91 beats/min, blood pressure was 130/70 mmHg and body temperature was 39°C. There was no heart murmur or breathing rale. There was knocking pain over left costo-vertebral angle. There was no pleural effusion or mediastinal deformity on chest roentgenogram (Fig 1A).

Two-dimensional echocardiograms revealed normal wall thickness (interventricular septum/left ventricular (LV) posterior wall=7/9 mm) and normal LV size (end diastolic/end systolic LV diameter=46/32 mm) with a slight decrease in the size of the left atrium (LA) (LA/aorta=24/35 mm). Color Doppler echocardiograms did not disclose significant regurgitation. Abdominal echograms revealed a shadow with a diameter of 52 mm in the epigastric area. Computed tomography revealed a contrast medium-stained mass 3×5 cm in diameter, surrounded by a thickened layer of low-density material with an unclear margin (Fig 2A). Aortography revealed a saccular-like aneurysm (diameter=5 cm) which was ruptured from the abdominal aorta (Fig 2B).

Hematological studies indicated a leukocyte count of 14,600/mm³ with 93.2% neutrophil and a hemoglobin level of 9.4 gm/dl. *Klebsiella pneumoniae* were again cultured from blood samples. These results

suggested a *Klebsiella pneumoniae*-induced mycotic aneurysm at the abdominal aorta. Based on the results of an antibiotic sensitivity test, maximum-dose antibiotic therapy (Cephadrine and Gentamicin) was performed for 3 days, but the symptoms did not improve. Moreover, the hemoglobin level decreased to 7.8 gm/dl on the 4th day. An emergency operation was suggested, but the family refused any surgical procedure. An abrupt drop in blood pressure with bloody pleural effusion (Fig 1B) appeared in the left lung field on the 5th day, and the patient expired. *Klebsiella pneumoniae* were cultured from the bloody pleural effusion. The family did not allow necropsy.

DISCUSSION

The term "mycotic aneurysm" was first used by Osler to describe the septic emboli seen in infective endocarditis. These embolic materials were carried by the blood to cause inflammation and subsequent destruction of the vascular wall in distal arteries, leading to a mushroom-shaped aneurysm.³ Today, the term "mycotic aneurysm" is commonly used in a broader sense.^{4,5} *Salmonella* sp are the major pathogens of mycotic aneurysm, especially infected aneurysms, and account for about 38% of all cases. *Staphylococcus aureus* accounts for about 30% of all cases, and is mainly isolated from endocarditis and trauma-related cases.⁶ In this case, the patient had no valvular heart disease clinically; cellulitis on his left thigh was diagnosed only 3 weeks before the patient expired. *Klebsiella pneumoniae* was the only bacteria isolated from cellulitis-related bacteremia, when aneurysm formation was complete, and also from the bloody pleural effusion after the aneurysm ruptured. Thus, *Klebsiella pneumoniae* is most likely the pathogen of mycotic aneurysm in this patient and originated from the cellulitis of the left thigh.

Klebsiella pneumoniae is a gram-negative rod encapsulated bacteria which mainly induces pneumonia and focal infection in systemically compromised patients. Anderson et al isolated *Klebsiella pneumoniae* along with *E. coli* from the wall of a mycotic aneurysm.⁷ To the best of our knowledge, however, this is the first case in which only

Klebsiella pneumoniae was isolated from a patient with mycotic aneurysm.

Clinically this patient had suffered from recurrent back pain with high fever for 10 days. Hematological studies disclosed neutrophil-dominant, leukocytosis and a positive blood culture. However, these findings are not specific for mycotic aneurysm of abdominal aorta. Associated findings, such as poorly controlled diabetes mellitus which increases the risk of endothelial damage, and a history of cellulitis-related bacteremia with recurrent fever due to incomplete antibiotic therapy, should also suggest mycotic aneurysm. Aortography and computed tomography have been used to make an accurate diagnosis of mycotic aneurysm, especially in thoracic and abdominal aorta.^{5,6} In this patient, aortography showed a saccular-like aneurysm on the left side of the abdominal aorta, and computed tomography revealed that this aneurysm was surrounded by a thickened low-density layer with an unclear margin. Together with the clinical findings, these findings suggested that after incomplete antibiotic therapy for cellulitis and bacteremia, the pathogen destroyed the atherosclerotic aortic wall and formed a pseudoaneurysm. From there, the pathogen was released into blood stream intermittently. Another possibility is that the pathogen continuously destroyed the tissues, the pseudoaneurysm eventually ruptured and *Klebsiella pneumoniae*-contaminated blood flowed back to cause left pleural effusion. Unfortunately, this was not confirmed by necropsy.

Finally, the rupture rate of gram-negative-related mycotic aneurysm is 84%, and the mortality rate is 85%.⁸ Medical treatment alone can not completely cure mycotic aneurysm.⁵ Therefore, emergency surgical intervention and an appropriate antibiotic treatment are indispensable for reducing the mortality rate.

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