

## Clinical features of *Acinetobacter baumannii* pneumonia

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**ABSTRACT** We clinically examined *Acinetobacter baumannii* pneumonia. Twelve patients with *A. baumannii* pneumonia were admitted for treatment in Kawasaki Medical School Kawasaki Hospital between January 2006 and December 2009. The clinical features of these cases have been retrospectively reviewed. The results showed that: (1) hospital-acquired pneumonia occurred in elderly patients with underlying diseases such as cerebrovascular disease or COPD; (2) the previous administration of antibacterial agents did not become a risk factor; (3) there are many drug-resistant strains that are resistant to PIPC and AZT, but sensitivity remains to IPM/CS and AMK; (4) prognosis is improved with the administration of carbapenem (effective rate 91.7%); (5) there was no outbreak of multidrug-resistant *A. baumannii*.

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Key words : *Acinetobacter baumannii*, Hospital-acquired pneumonia

### INTRODUCTION

*Acinetobacter baumannii* occurs extensively in nature, including in soil, water and in the skin of healthy individuals; particularly in the axilla or between the toes, where perspiration creates a moist environment. Generally, it does not cause infection in healthy individuals. However, it can cause opportunistic infections in the respiratory tract and urinary tract, as well as in wounds and blood in compromised patients<sup>1–3)</sup>. Recently, hospital-acquired infection caused by multidrug-resistant

*A. baumannii* has been discussed<sup>4–6)</sup>. Therefore, we examined the clinical features of *A. baumannii* pneumonia in our hospital.

### SUBJECTS AND METHODS

#### Subjects

The subjects were patients with *A. baumannii* pneumonia admitted for treatment in Kawasaki Medical School Kawasaki Hospital between January 2006 and December 2009.

*A. baumannii* pneumonia was defined as

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pneumonia with *A. baumannii* of  $10^7$ /ml or greater detected by a sputum culture.

### Methods

Underlying diseases, antibacterial agents before the detection of *A. baumannii*, susceptibility to various antibacterial agents, and the treatment and its outcome were retrospectively examined.

## RESULTS (Table.1)

### Cases

*A. baumannii* pneumonia in 12 subjects was examined. The subjects included 10 males and 2 females aged from 66 to 94 years. All subjects developed hospital-acquired pneumonia<sup>7)</sup> diagnosed as mild in three, moderate in seven, and severe in two. The severe subject's pneumonia was classified as ventilator-associated pneumonia.

### Underlying diseases

Underlying diseases included cerebrovascular disease in seven subjects, COPD in two, idiopathic interstitial pneumonia in one, old pulmonary tuberculosis in one, and chronic rheumatoid arthritis

in one.

### Previous administration of antibacterial agents

Antibacterial agents were administered to three of the 12 patients before the detection of *A. baumannii*. Administered antibacterial agents included sulbactam / ampicillin (SBT /ABPC) in two cases and piperacillin (PIPC) in one.

### Susceptibility to various antibacterial agents

Six (50%) of the 12 strains were resistant to aztreonam (AZT), five (41.7%) strains were resistant to PIPC, two (16.7%) strains were resistant to levofloxacin and one (8.3%) strain was resistant to ceftazidime (CAZ). All strains were sensitive to imipenem / cilastain (IPM / CS) and amikacin (AMK).

### Treatment, Clinical efficacy and Bacteriological efficacy

The choice of drugs were meropenem (MEPM) in four cases, IPM/CS in three, CAZ in two, and SBT / ABPC, sulbactam / cefoperazone (SBT / CPZ) and ciprofloxacin (CPFX) in one each.

Table 1. The clinical features of cases with *Acinetobacter baumannii* pneumonia

Cases	Age	Gender	Classification of pneumonia	Underlying diseases	Previous administration of antibiotics	Susceptibility <i>A. baumannii</i> to antibiotics						Treatment	Clinical efficacy	Bacteriological efficacy
						PIPC	CAZ	IPM	AZT	AMK	LVFX			
1	66	M	HAP*(moderate)	Cerebrovascular disease	(-)	S	S	S	S	S	S	SBT/ABPC	Good	Eradicated
2	68	M	" ( " )	"	(-)	S	S	S	S	S	S	CAZ	"	"
3	76	M	" ( " )	I I P s	(-)	S	S	S	Ⓡ	S	S	IPM/CS	"	"
4	78	M	" ( " )	COPD	(-)	S	S	S	S	S	S	MEPM	"	"
5	80	F	" (mild)	RA	(-)	S	S	S	Ⓡ	S	S	MEPM	"	"
6	81	F	" (mild)	Cerebrovascular disease	(-)	Ⓡ	Ⓡ	S	Ⓡ	S	S	SBT/CPZ	"	Unknown
7	83	M	" (severe),VAP**	"	SBT/ABPC	Ⓡ	S	S	Ⓡ	S	S	CAZ	"	Eradicated
8	85	M	" (moderate)	"	(-)	S	S	S	S	S	S	MEPM	"	"
9	86	M	" ( " )	"	SBT/ABPC	S	S	S	S	S	S	IPM/CS	"	"
10	86	M	" (mild)	Old pulmonary tb.	(-)	Ⓡ	S	S	S	S	S	CPFX	"	Unknown
11	94	M	" (moderate)	Cerebrovascular disease	(-)	Ⓡ	S	S	Ⓡ	S	Ⓡ	IPM/CS	"	"
12	90	M	" (severe)	COPD	P I P C	Ⓡ	S	S	Ⓡ	S	Ⓡ	MEPM	Poor (death)	Persisted

HAP\* : hospital - acquired pneumonia

VAP\*\* : ventilator -associated pneumonia

The medication was clinically effective in 11 of the 12 subjects and non-effective in one (effective rate 91.7%). The non-effective case was a severely affected subject, who died due to pneumonia.

Bacterial eradication was achieved in nine traceable subjects and but not in one and the deceased subject (eradication rate 88.9%).

## DISCUSSION

*A. baumannii* pneumonia is a hospital-acquired pneumonia in many cases and extremely rare in healthy individuals. It occurs in elderly patients with underlying diseases, which is consistent with the conventional reports<sup>1-6</sup>.

It is pointed out that *A. baumannii* pneumonia is important as the causative pathogen in ventilator-associated pneumonia<sup>3,8,9</sup>: among our subjects, one was classified as ventilator-associated pneumonia.

The occurrence of *A. baumannii* pneumonia was sporadic and there was no evidence of an outbreak in our hospital.

In the literature, severe community-acquired pneumonia is sometimes reported<sup>10-15</sup>. However, in our subjects there was no community-acquired pneumonia.

Leung et al.<sup>8</sup> reported that the underlying diseases in *A. baumannii* pneumonia includes COPD, at a high frequency, and cerebrovascular diseases. This is consistent with our results.

It is reported that previous administration of antibacterial agents is a risk factor for the onset of *A. baumannii* pneumonia or sepsis<sup>3,8</sup>. However, only three out of our 12 subjects were previously administered antibacterial agents before the detection of *A. baumannii*. This means that the previous administration of antibacterial agents was not a risk factor in the onset of *A. baumannii* pneumonia in our cases.

With regards to the susceptibility to various antibacterial agents, many strains were resistant to

PIPC, AZT, CAZ and LVFX. However, all strains were sensitive to IPM / CS and AMK.

Recently, multidrug-resistant *A. baumannii* with resistance to carbapenem or aminoglycoside has become a serious problem in hospital-acquired infections<sup>4,6</sup>. However, in our subjects, resistance against IPM / CS and AMK was not observed. This fact might contribute to an improved prognosis with an efficacy rate of 91.7% and an eradication rate of 88.9%. There seems to be no contamination of the multidrug-resistant *A. baumannii* in our hospital,

For the treatment, the choice of drugs included carbapenem in seven cases (MEPM in four, and IPM/CS in three), which was most frequently used, followed by cephem in three (CAZ in two, and SBT/CPZ in one). These choices may be appropriate in terms of the hospital-acquired pneumonia guideline<sup>7</sup>, and sensitivity.

The case of death was a severely affected subject. There were no deaths among the mild or moderate subjects. The validity of the severity classification using life prognosis in the JRS guidelines for the management of hospital-acquired pneumonia<sup>7</sup> was demonstrated.

The *A. baumannii* pneumonia we treated is summarized as follows: (1) hospital-acquired pneumonia occurred in elderly patients with underlying diseases such as cerebrovascular disease or COPD; (2) previous administration of antimicrobial agents was not a risk factor; (3) there are many strains resistant to PIPC and AZT, but sensitivity remains to IPM/CS and AMK; (4) prognosis was improved with the administration of carbapenem (effective rate 91.7%); (5) there was no outbreak of multidrug-resistant *A. baumannii* in our hospital.

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