NOSOCOMIAL PNEUMONIAS IN THAILAND

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Abstract. In order to compare the etiology, clinical manifestations, and prognosis of patients acquiring nosocomial pneumonia, we studied and compared sixty normal hosts who acquired nosocomial pneumonia during Jan 1, 1989 - Dec 31, 1991 (group I) with seventy-two immunocompromised patients with nosocomial pneumonia who were admitted during 1984-1992 (group II).

Both groups were similar in some patterns, *eg* gram-negative bacilli were common (80%, 50%), the chest roentgenogram showed initial localized lesions (74%, 72%), and there was a high mortality rate (46.7%, 54.2%).

The differing findings were that the first group acquired pneumonia more often during the first 7 days after admission, transbronchial aspiration was believed to be the route of entry and most of the patients had productive coughs. Blood cultures rarely yielded the organisms (7%). The second group had pneumonia at a mean of 32 days after admission, hematogenous spread to the lungs was common and blood cultures more often yielded the etiologic organisms (41.7%).

INTRODUCTION

The lung accounts for 15 percent of all hospital-acquired infections in Thailand (Danchaivijitr and Chokloikaew, 1989) and in the United States (Pennington, 1990). Nosocomial pneumonia currently is the most common fatal hospital acquired infection. It is often difficult to identify the etiologic agents and institute proper treatment, especially among immunocompromised hosts. Thus we aimed to compare clinical manifestation and the causative agents of nosocomial pneumonias between normal hosts and immunocompromised hosts.

MATERIALS AND METHODS

We compared two groups of nosocomial pneumonias in the Department of Medicine, Ramathibodi Hospital, Bangkok:

Group I : included 60 normal hosts with hospital acquired pneumonia who were admitted during 1 January 1989-31 December 1991.

Group II : included 72 immunocompromised patients with nosocomial pneumonia who were admitted during 1984-1992.

Data collected included sex, age, day of acquisition, clinial manifestation, white blood cell counts, roentgenographic pattern, sputum examination, blood cultures, clinical course and outcome. They were analyzed and compared.

Statistical analysis

The student's *t* test was used; a p value of less than 0.05 was considered significant.

RESULTS

The age and sex were not statistically different among the two groups (Table 1). Normal hosts with nosocomial pneumonias acquired the infection earlier than did compromised patients. Normal hosts acquired infection mostly within a couple of weeks after admission due to post-operative complications or ventilator-associated pneumonias. Compromised patients acquired pneumonitis 3-4 weeks after admission, usually following several courses of chemotherapy.

Productive cough was common among normal hosts, but was uncommon among immunocompromised patients ($p < 0.05$). Sepsis, bacteremia and positive pleural fluid cultures were common among immunocompromised hosts (Table 2).

Blood cultures were performed in 40 group I patients and were positive in only 4 cases (10%).

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Table 1

Age, sex of the patients, days and routes of acquisition of nosocomial pneumonias.

	Normal hosts n=60	compromised hosts n=72	p-value
Age (years)	55.7±27.4	45.9±25.3	>0.05
Sex (male : female)	31 : 29	35 : 37	>0.05
Days of acquisition	7.6±6.2	32±24.1	<0.05*
Routes of acquisition			
- transbronchial	93%	58.3%	<0.05*
- hematogenous	7%	41.7%	<0.05*

*p<0.05

Treatment was successful in 32 of this group, (20 patients were treated for gram-negative bacilli and 12 for gram positive cocci). Of group II, blood cultures were positive in 30 out of 72 patients (41.7%).

Bronchoalveolar lavage was performed in ten cases and this helped us in making a diagnosis in 9 cases of group II. Three patients had pleural effusions, and the organisms could be identified by culture. A therapeutic trial was successful in 13 cases. (12 were treated for gram-negative bacilli and one as a fungal infection).

Common responsible agents were gram-negative bacilli in both groups. Fungal infection appeared in two cases among immunocompromised patients and the causative agents were not identified in 30 of this group (Table 3, 4).

Nosocomial pneumonias prolonged the hospital stay for 27 days among I and for 33 days among group II. The mortality rate was 46.7% and 54.2% respectively.

DISCUSSION

The different characteristics of nosocomial pneumonias among normal hosts and immunocompromised hosts are evident in our study. Normal hosts acquired the infection during the postoperative period or during ventilatory support within 1-14 days (mean 7 days) after admission. The most likely route of entry of the organisms was transbronchial. Patients had productive coughs. Blood cultures were positive in only 4 cases (7%) and this is similar to the result of a study from the Centers for Disease Control (CDC,

Table 2

Clinical and laboratory findings of nosocomial pneumonias among normal and compromised hosts.

	normal host n=60	compromised host n=72	p-value
Fever	58 (97%)	70 (97%)	>0.05
Productive cough	56 (93%)	16 (22%)	<0.05*
Positive blood culture	4 (7%)	30 (42%)	<0.05*
Positive pleural fluid culture	0	3 (4%)	>0.05
Chest roentgenogram			
localized lesion	74%	72%	>0.05
diffuse lesion	26%	28%	>0.05

*p<0.05

Table 3

Causative agents in hospital-acquired pneumonias and mortality rate.

Agents	Normal host	No. deaths	Compromised host	No. deaths
Gram-negative bacilli	48	28	36	21
Gram-positive cocci	12	0	4	0
Fungus	0	-	2	1
Not identified	0	-	30	17
Total	60	28 (46.7%)	72	39 (54.2%)

Table 4

Immunocompromised hosts with nosocomial pneumonias and positive blood culture : causative agents and mortality rate.

Organism	n	No. of deaths
Pseudomonas aeruginosa	12	9
Klebsiella pneumoniae	7	7
Acinetobacter calcoaceticus	5	5
Salmonella sp	1	0
Streptococcus viridan	3	0
Staphylococcus aureus	1	0
Candida sp	1	1
Total	30	22

1984), which showed that bacteremia occurred in fewer than 10% of nosocomial pneumonias.

Immunocompromised patients who recieved chemotherapy were prone to infection. Most of these began to acquire nosocomial pneumonias at the third to fourth weeks after admission. Bacteremias were common (39.2%) and were the cause of nosocomial pneumonia. These patients, in contrast to the normal hosts, did not produce sputum.

Pleural effusions were rare in nosocomial pneumonia especially among normal hosts. Three cases of pleural effusion among immunocompromised patients (4%), which facilitated identification of the causative agents.

Bronchoalveolar lavage helped to identify the causative agent in nine immunocompromised patients. One had fungal pneumonia and 9 had gram-negative bacillary pneumonia. This technique yielded good results and was safe even in patients on ventilators or who had bleeding disorders (Saenghirunvattana and Charoenpan, 1989).

The major causative agents were gram negative bacilli in both groups. In spite of broad spectrum antibiotics, ventilatory support and intensive care, the mortality rate was still high (46.7% and 54.2% in normal and immunocompromised hosts, respectively). The high mortality was highest in elderly patients, chronic lung disease, intubation and immunocompromised hosts (Pennington, 1990).

Because of the high cost of treatment and the high mortality, more attention should be paid to preventive measures such as hand washing and proper suction techniques. These may reduce the incidence of aspiration of bacterial pathogens into the lower respiratory tract.

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