

ACUTE *PSEUDOMONAS PSEUDOMALLEI* PNEUMONIA AND SEPTICEMIA FOLLOWING ASPIRATION OF CONTAMINATED WATER : A CASE REPORT

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INTRODUCTION

Pseudomonas pseudomallei are motile gram negative bacilli, that have been isolated from water and soil in Southeast Asia, notably in rice fields in Thailand (Finkelstein, 1967) and Malaysia (Strauss *et al.*, 1969). Most of the patients with melioidosis reported from various parts of the world acquired the disease from the Far East (Patterson *et al.*, 1967; Spotnitz *et al.*, 1967; Thin *et al.*, 1970; Everett and Nelson, 1975). How man became infected is not exactly known. Possible routes of infection are contamination of broken skin (Thin *et al.*, 1970; Jayanetra *et al.*, 1975), inhalation of bacteria (Dannenberg *et al.*, 1958; Patterson *et al.*, 1967) and even by sexual contact (McCormick *et al.*, 1975). This report presents a patient with acute pneumonia and septicemia due to *Pseudomonas pseudomallei* from aspiration of contaminated water.

Case report

A 30-year-old healthy Thai man was involved in an automobile accident, in which his car skidded into a muddy canal. The patient got out of the car with difficulty after swallowing and aspirating a fair amount of muddy water. He vomitted some muddy fluid and felt better. Six hours later he became short of breath, and cough up pinkish foamy sputum. When seen at the emergency room of Songkhlanagarind Hospital on October 5, 1984, he showed mild dyspnea without cya-

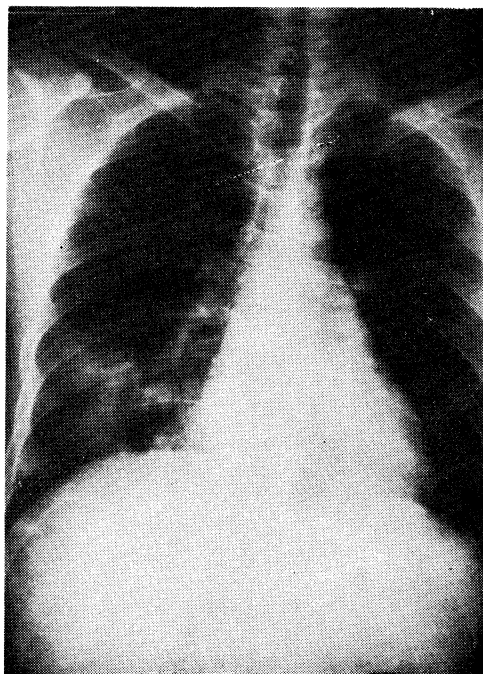


Fig. 1—Pneumonia in right lower lung.

nosis. He was alert, with a blood pressure 116/70 mm Hg, pulse rate of 84/min and respiration rate of 20/min. He was afebrile. There were diffuse crepitations on both sides of the chest. The rest of the physical examinations were unremarkable. He had no bruise nor abrasions on his skin. An initial chest roentgenogram revealed an infiltration at the right lower lung field (Fig. 1). He was admitted with the provisional diagnosis of pulmonary edema from near-drowning. He was treated with furosemide 80 mg intrave-

nous. 12 million units of penicillin sodium per day, gentamicin 80 mg every 8 hours, plus dexamethasone 2 gm per day intravenously. Forty-eight hours after admission his temperature rose to 40°C and his respiration rate rose to 40/min. The patient began coughing up bloody grayish green sputum. The right middle and lower lung fields now showed crepitations and decreased breath sound. Sputum and blood samples were taken for culture. Dexamethasone was discontinued. The antimicrobial agents were then switched to ticarcillin 18 gm together with chloramphenicol 4 gm per day, and amikacin 300 mg every eight hours, all by intravenous route for a presumed diagnosis of aspiration pneumonia with gram negative organism. The repeat chest roentgenogram showed marked progression of the pneumonic process (Fig. 2). On the fourth day he had severe chest pain, more productive cough and

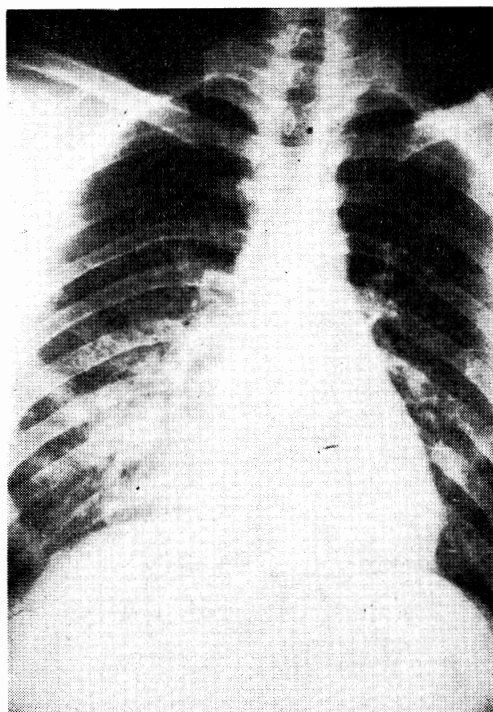


Fig. 2—Marked progression of pneumonia process.

dyspnea necessitating endotracheal intubation. Bronchial suction resulted in large amounts of coffee-ground sticky sputum which was also sent for culture. The patient soon became more dyspneic, restless and hypotensive despite inotropic agents and mechanical ventilation with PEEP. The patient expired on day 6 after admission. Permission for autopsy was not granted. Subsequently, the three sets of blood and sputum cultures obtained on day 2 and 5 grew *Pseudomonas pseudomallei* and its sensitivity to the antibiotics is shown in Table 1.

Special study: Following his death we went to the site of the accident and using sterile techniques, we collected the surface water and the mud from the canal. The specimens were incubated in Tryptic Soy Broth (TSB) for 48 hours, then plated onto Eosin Methylene Blue (EMB) agar and MacConkey agar. After 37°C incubation, two out of three of the samples collected grew *Pseudomonas pseudomallei* that had the same biochemical characteristic and antibiotic sensitivity as the organisms isolated from the patient (Tables 1-2).

DISCUSSION

Melioidosis has been observed in all age groups (Patamasucon *et al.*, 1982) but in the late 1960s to early 1970s it was reported predominantly in healthy military personnel during the Viet Nam War (Patterson *et al.*, 1967; Spotnitz *et al.*, 1967; Everett *et al.*, 1975). In the endemic areas like Thailand, people with debilitating diseases and diabetes mellitus are vulnerable to this infection (Chayasirisobhon *et al.*, 1976). Patients may present either as an acute or chronic illness. In the acute form, it begins suddenly after an incubation period of 7 to 14 days with chills, high fever and marked prostration. The disease is most commonly recognized as an acute pneumonia. Bacteremia occurs early

Table 1

Antibiotics susceptibility of the isolates of *P. pseudomallei* from the patient and environment.

Antibiotic	Blood	Sputum	Canal water	Mud
Amikacin	R	ND	R	ND
Ampicillin	ND	R	R	R
Cephalothin	R	R	R	R
Chloramphenicol	S	S	S	S
Kanamycin	IS	S	S	S
Gentamicin	R	R	R	R
Polymyxin B	R	R	R	R
Streptomycin	R	R	ND	ND
Tetracycline	S	S	S	S
Trimethoprim	R	ND	R	R
Sulphamethoxazole	S	ND	ND	ND
Ticarcillin	S	S	ND	ND

S = susceptible, IS = intermediate, R = Resistant, ND = not done.

Table 2

Biochemical characteristics of the isolates of *P. pseudomallei* from the patient and scene of accident.

Test	Blood	Sputum	Canal water	Mud
Growth on MacConkey agar	+	+	+	+
Growth on SS agar	-	-	-	-
Motility	+	+	+	+
Oxidase	+	+	+	+
Catalase	+	+	+	+
Simmon's citrate	+	+	+	+
Nitrate reduction	+	+	+	+
Gas from nitrate	+	+	+	+
Urease	-	-	-	-
Indole	-	-	-	-
TSI slant acid	+	+	+	+
TSI butt acid	-	-	-	-
H ₂ S (TSI)	-	-	-	-
Sugar oxidation				
Sucrose	+	+	+	+
Lactose	+	+	+	+
Glucose	+	+	+	+
Maltose	+	+	+	+
Manitol	+	+	+	+
Gelatin	+	+	+	+
Arginine dihydrolase	+	+	+	+
Lysine decarboxylase	-	-	-	-

and there is widespread dissemination throughout the body with subsequent abscess formations. The mortality rate in acute septicemic form is high (Patamasucon *et al.*, 1982).

The respiratory tract is one of the portal of entry in humans. The helicopter crewmen during Viet Nam War developed pulmonary melioidosis, presumably by inhalation of the contaminated dusts raised by the helicopter propeller (Weber *et al.*, 1969). Mice and hamsters can be experimentally infected by aerosols containing bacteria (Dannenberg and Scott, 1958). Stanton and Fletcher (1925) were able to transmit the disease into guinea pigs by painting the organisms onto the nasal mucosa. Another possible route of infection is via the skin (Jayanetra *et al.*, 1975). Nigg and Johnston (1961) mentioned three cases of melioidosis who developed the disease after automobile accidents from which they had lacerations contaminated by muddy water. Our patient had no laceration, no scratch marks nor fractures, presented with classical picture of acute septicemic form of melioidosis (Weber *et al.*, 1969). The initial chest roentgenogram (Fig. 1) showed findings indicative of aspiration pneumonia. The organisms isolated from the blood and sputum of the patient had the same sensitivity profile and were biochemically similar to the isolates from the canal (Table 2) where the accident took place. It was likely that the organisms was introduced into the patient by aspiration. The used of corticosteroid could have complicated the disease by maximizing the severity of infection (Chayasirisobhon *et al.*, 1976; Patamasucon *et al.*, 1982).

In conclusion the possibility of *Pseudomonas pseudomallei* infection should be kept in mind when one is confronted with a victim of fresh-water near-drowning in Southeast Asia. Appropriate cultures should be obtained and the specific antimicrobial therapy should be started early.

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