

**PNEUMONIA :
DEVELOPING & SPREADING AS
RESULT OF NATURE AND DISASTER**

NURJANNAH LIHAWA

PIRMA 2019





CURRICULUM VITAE

- **NURJANNAH LIHAWA**
- **UJUNG PANDANG, 21 MARET 1975**
- **S1 : FAKULTAS KEDOKTERAN UNHAS, 1998**
- **PROFESI DOKTER : FAKULTAS KEDOKTERAN UNHAS, 2000**
- **SP-1 : FAKULTAS KEDOKTERAN UNAIR, 2014**
- **SMF PULMONOLOGI RSUP WAHIDIN SUDIROHUSODO 2015-SEKARANG**
- **DOSEN LUAR BIASA FK UNHAS 2016-SEKARANG**



INTRODUCTION

- Asia is susceptible to the effect of natural disaster
 - Geology : earthquake, volcanoes and tsunamis
 - High population density
- Survivor will increase risk of pulmonary diaseases such as Pneumonia

Robinson, Alatas, Robertson et al. Natural disasters and the lung,
Respirology (2011) 16,386-95



PNEUMONIA AS A RESULT ASPIRATION / NEAR DROWNING

- Aspiration : inflow of material from the oral cavity or upper GIT into the lungs through the larynx.
- Near Drowning caused by Tsunami, hurricane, or flash flood.
- Patients swallowed soil-contaminated salt water, developed aspiration pneumonia even worse ARDS.
- The infectious pulmonary process that occurs after abnormal entry of fluids into lower respiratory tract is termed as **aspiration pneumonia**.
- Tsunami 2004, near drowning and trauma constituted most of immediate post-disaster morbidity



PATHOPHYSIOLOGY



Table 1 Pathophysiology and imaging findings of near-drowning

ASPIRATION PNEUMONIA

- Aspiration pneumonia (infectious process secondary to aspiration event) : acute lung infection that occurs after aspiration of oropharyngeal or upper GI contents in large volume.
- Bacterial load from oral cavity or upper GIT normally non-virulent and usually anaerobic organism, but capable to induced lung infection due to their large volume.
- The entry of fluid into the bronchi and alveolar space triggers an anti-inflammatory reaction with the release of proinflammatory cytokines, tumor necrosis factor alpha, and Interleukins. Inoculation of organisms of common flora from the oropharynx and esophagus results in the infectious process.



ETIOLOGY

- Different organisms may predominate in freshwater and saltwater aspirations, but aerobic Gram-negative bacteria, including pseudomonas and pseudomonas-like species, are often reported.
- Colonizers of the oropharynx, such as streptococcus pneumoniae, staphylococcus aureus and anaerobes, may translocate to the lung during aspiration and cause infection.
- The majority of organisms isolated from blood or sputum culture of victims of the 2004 tsunami were Gram-negative bacteria, and included cases of Burkholderia pseudomallei, which causes melioidosis and is endemic in South-East Asia



SIGN AND SYMPTOM

- Vomiting of swallowed water, lead to aspiration of gastric content, worsened if patient decrease consciousness and airway protective reflexes is decreased.
- Sign of significant aspiration usually detectable clinically, of that, victims that has no sign of aspiration on presentation (coughing, normal examination, normal blood gases, and normal CXR) were less likely to develop pulmonary oedema or pneumonia, thus no need for further medical intervention.
- Acute symptoms : coughing, choking, shortness of breath, cyanosis, tachypnea, tachycardia, speaking difficulty, and hoarseness



TREATMENT MANAGEMENT

- To prevent further aspiration, patient's position should be adjusted followed by suction of oropharyngeal contents with the placement of the nasogastric tube.
- In patients who are not intubated humidified oxygen is administered and the head end of the bed should be raised by 45 degrees.
- A close monitoring of patients oxygen saturation is important and immediate intubation with mechanical ventilation should be provided if hypoxia is noted.
- A flexible bronchoscopy is usually indicated for large volume aspiration to clear the secretion and also for obtaining the sample of bronchoalveolar lavage for quantitative bacteriological studies.



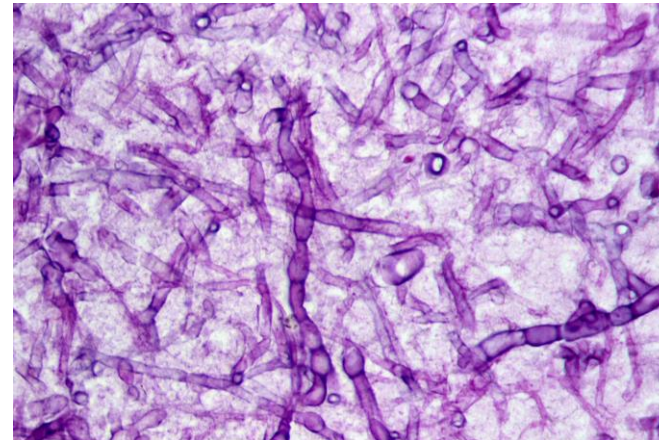
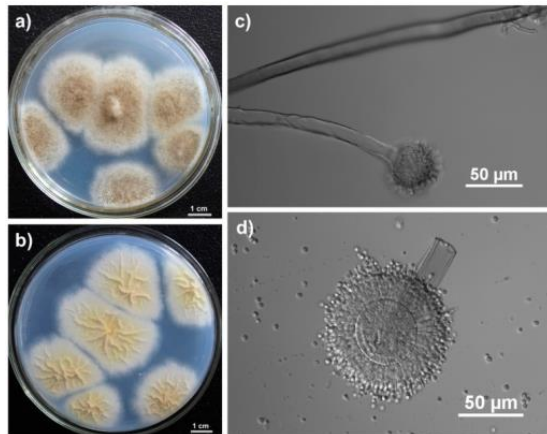
TREATMENT MANAGEMENT

- In general practice, antibiotics are initiated immediately to prevent progression of the disease.
- Antibiotic therapy may need to include agents active against pseudomonas and any locally prevalent organisms.
- The choice of antibiotics for aspiration pneumonia are ampicillin-sulbactam with Azithromycin, or a combination with metronidazole.
- Once the culture results are obtained the antibiotic regimen should be narrowed to organism-specific.



COMPLICATION

- Fungal infection can also complicate near drowning
- should be considered in patients not responding to antibacterial therapy, in those who develop pneumonia some time after the acute aspiration and in those who develop brain abscess or meningitis



INDIRECT EFFECT OF NATURAL DISASTER ON THE LUNG

- **Acute Respiratory Infection (ARI) :**
a major cause of illness and death among displaced populations and often occur in the first 3–5 days following the emergency
- **The ARI due to viral diseases in crowded refugee/ displaced population settings spreads quickly.**
- **Overcrowding is an important pulmonary risk for healthy displaced survivors**



PREVENTION OF SPREADING

1. Adequate ventilation
2. Separating infected patients from other patients
3. Limiting contact between infected and uninfected people
4. Spatial separation (> 1 m) between patients
5. Cleaning and disinfection of contaminated surfaces and items.





Natural disaster could cause direct and indirect effect of the lung



Aspiration pneumonia as a result of direct effect of disaster on the lung



Communicable disease such acute respiratory infection (ARI) could arise in first week after impact



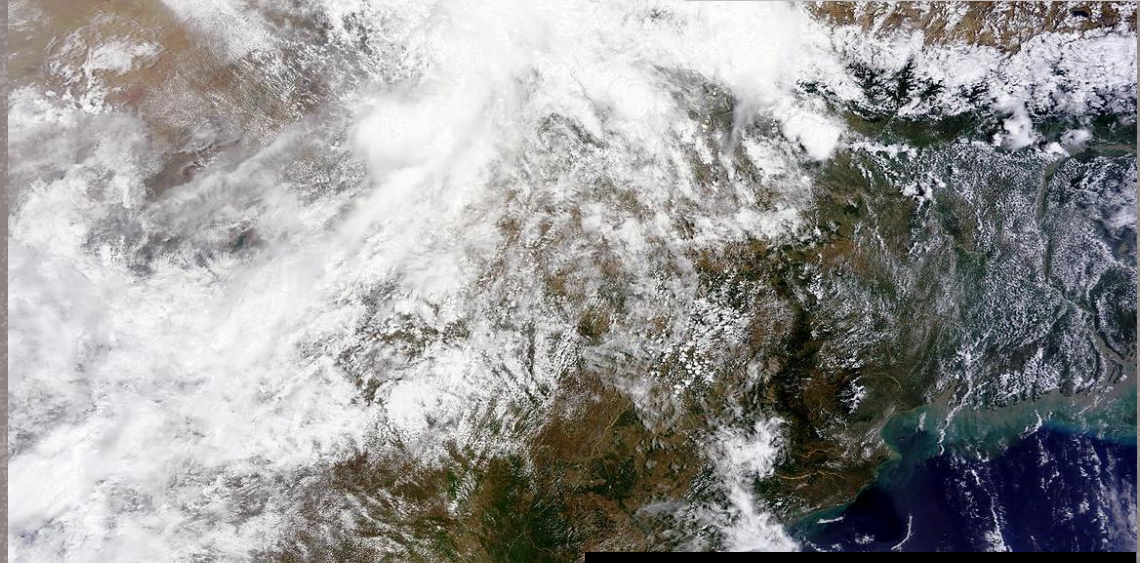
Several actions could prevent the spreading of ARI : adequate ventilation, separating infected patients, limiting contact, spatial separation and cleaning and disinfection.

TAKE HOME MESSAGE





TERIMA KASIH



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