The Role Of ICU in TB Management

Menaldi Rasmin
Robert Koch & Tuberculosis
1843-1910

Robert Koch - Founder of Modern Bacteriology:

Bacillus anthracis, 1877
Mycobacterium tuberculosis, 1882
Vibrio cholerae, 1883
The Epidemiology and Outcome of Prehospital Respiratory Distress

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Abstract

Objectives: Patients with respiratory distress often seek emergency medical care and are transported by ambulance. In this study, we evaluated the epidemiology and outcomes of prehospital respiratory distress in an urban center.

Methods: This study was a retrospective analysis of 166,908 EMS encounters from 2010 to 2013 in an urban center. We excluded encounters with an initial chief complaint other than respiratory distress. The main outcome of interest was hospitalization. We used logistic regression to identify factors associated with hospitalization.

Results: Among the 166,908 EMS encounters, 19,858 (12%) were for respiratory distress. Of these, 9,964 (50%) were hospitalized, 3,094 (30%) required intensive care, 948 (10%) died prior to discharge, and 1,501 (10%) received invasive mechanical ventilation.

Conclusions: In a population-based cohort, EMS personnel commonly encounter prehospital respiratory distress among medical patients, many of whom require hospital admission to the intensive care unit. These data may help to inform targeted therapy or more efficient triage and transport decisions.
PTB: Reasons for ICU Admission

- Acute Respiratory Failure
- Development of multi-organ failure
- High Rates of ARDS
- Neurological deterioration (due to meningitis TB)
- Others: massive hemoptysis, cardiogenic shock, liver failure, renal failure, DIC, airway obstruction, pituitary apoplexy
## Delayed Diagnosis of Active Pulmonary Tuberculosis in Emergency Department

Tsai TC, Hung MS, Chen IC, Chew G, Lee WH  
*American Journal of Emergency Medicine 2008;26:888-892*

<table>
<thead>
<tr>
<th></th>
<th>NonDelayed TB Group</th>
<th>Delayed TB Group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical CXR findings</td>
<td>79,8%</td>
<td>31,6%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pneumonia at ED</td>
<td>22,6%</td>
<td>68,4%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Length of initiation of TB treatment</td>
<td>0 (0-1) days</td>
<td>9 (6-16) days</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>In-Hospital Mortality Rate</td>
<td>15,5%</td>
<td>47,4%</td>
<td>&lt;0.01</td>
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<tr>
<td>ICU Admission</td>
<td>Lower In-Hospital Survival</td>
<td></td>
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</tbody>
</table>

**Conclusion:** ICU Admission & Age are associated with mortality
10 Most Frequent Diseases With Acute Respiratory Failure

**Karakteristik dan Keluaran Pasien Gagal Napas Akut di RSUP Persahabatan Tahun 2015**

Rasmin M, Elhidi M, Syahputra W

- Total: 150 pts
- Mean age: 51 thn
- Male: 103 (68.7%)
- Female: 47 (31.3%)

**With MV**: 51 pts
- Pneumonia
- PTB
- COPD
- BE
- CHF
- Lung Ca
- Hipertension
- DM
- Destroyed Lung

**Without MV**: 99 pts

**Total with MV**: 51 pts
**Total without MV**: 99 pts
ICU & TB
PTB Diagnosis in the ICU

• Delayed diagnosis on ICU admission:\(^1\):
  1. low yield of initial diagnostic tests
  2. nonspecific radiographic studies
  3. willingness of critical care staff to attribute overwhelming illness to more common conditions seen in the ICU
  4. empiric AB or immunosuppressive Th/ on nonTB

• Diagnosis may be confounded by atypical clinical presentation & the lack of sensitive and rapid diagnostic tests:\(^2\):
  161 tracheal aspirate only 48 (30%) AFB stain positive,
  80 (69%) were culture positive

• GenXpert should be chosen where available:\(^3\)

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The Role of Thoracic Imaging

- Portable Chest Radiography (CXR) : the most common radiography examination requested\(^1\)
- CXR does not contribute as much as expected in the clinical diagnosis and suspicious of PTB in the ICU setting\(^2\)
- Different features of TB patients in the ICU may be easily misled\(^3\)
- Thoracic CT-scan : detects pathology not visible on conventional portable CXR\(^1\)

Subjek: 130 pasien diduga TB, BTA Negatif
   84 pasien dinyatakan TB dibandingkan dg rujukan standar

Sistem Skoring: usia, riwayat merokok, kontak TB serta 9
   karakteristik kelainan utama pada CT-scan Toraks
   potongan terbatas

Kesimpulan: Sistem Skoring CT-scan Toraks tanpa
   kontras potongan terbatas mempunyai akurasi yang setara dengan rujukan standar untuk
   menegakkan diagnosis TB paru dewasa
Outcome of TB patients Requiring ICU

- A very high mortality rate among acute pulmonary TB (APTB) patients in the ICU¹,²,³,⁴
- Predictive factors: miliary PTB, mechanical ventilation & vasopressor requirement on admission⁴
- SAPS (Simplified Acute Physiology Severity)-II significantly associated with mortality⁵

Mortality of PTB in ICU

• **In-Hospital Mortality**\(^1\) : 25.9% > 22.4% in ICU  
  Mean : 53.6 days (50% within the first 32 days)  
  Independently associated Risk Factors : Acute Renal Failure, need for MV, chronic Pancreatitis, sepsis, ARDS, nosocomial pneumonia

• **RICU**\(^2\)  
  - Mortality Rate : 74%  
  - Medial Length of Stay : 5 days  
    – Respiratory Failure: the most common cause of admission  
    – MV : 65%  
  - complication : in 45% of pts  
  – nonsurvivors : female, lower diastolic BP, far advanced lesion, Type-II RF, higher APACHE-II Score, lower GCS Score, increased need for MV, electrolyte disturbance

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RICU : One Step of Solution

- More than 35% ICU pts: purely respiratory cases
- Respiratory failure in Pneumonia is 34.8%
- Shortening time to ICU, since >75% pts come from the ward and, >15% pts from EU
- ICU’s outcome:
  - shortening LOS pulmonary pts 1-3 days (43.8%)
  - shortening the use of MV, 1-3 days (70.69%)

Rasmin M. Characteristic of RS Persahabatan ICU Patients With Tight Supervision of the Pulmonology Resident in Training. 2001
TB Management & the ICU

• EU: Respiratory distress → Beware of TB
  Dx: Comprehensive Anamnesis & PE
  CXR
  AFB- (genXpert + smear)
  Consider directly to RICU

• RICU: repeat Dx procedures for TB
  analysis for fatality risk factor
  consider anti-TB medication
Ethical Issues

a. Doctor’s Competency & attitude to the patient
   (ct. careless, dishonesty, information openness)

b. Business practice
   (ct. billing system, reporting, documentation)

c. Professional practice
   (ct. willingness to refer patient, the chance to work in a proper competency, nonprofessional relationship)

Ethical Issues

• *Patient safety is the absence of preventable harm to a patient during the process of health care* (the coordinated efforts to prevent harm, caused by the process of health care itself, from occurring to patients)

• Hippocrates:
  
  .....” In Arts there are diseases, the diseased and doctors. Doctor is the servant of the Arts”......