ERS Annual Congress Barcelona
7-11 September 2013

EDUCATIONAL MATERIAL

Morning seminar- MS6

Community-acquired pneumonia: moving from guidelines to clinical practice

Thank you for viewing this document. We would like to remind you that this material is the property of the author. It is provided to you by the ERS for your personal use only, as submitted by the author.

© 2013 by the author

Room 3.7
Morning Seminar MS6

Tuesday, 10 September 2013 (07.00 – 08.15)

Community-acquired pneumonia: moving from guidelines to clinical practice

Prof. Mark Andrew Woodhead
Dept of Respiratory Medicine
Manchester Royal Infirmary
Oxford Road
M13 9WL MANCHESTER
UNITED KINGDOM
mark.woodhead@cmft.nhs.uk

Prof. Antoni Torres
Head of Intensive Care Unit
Dpt of Pneumology & Allergy Respiratory
Hospital Clinic de Barcelona
Villarroel, 170
08036 Barcelona
SPAIN
atorres@clinic.ub.es

Chair: Dr. Roberto Cosentini
Gruppo NIV_U.O. Medicina D'Urgenza
Fondazione IRCCS
Ca' Granda Ospedale Maggiore Policlinico
Via F. Sforza 35
20122 MILAN
ITALY
r.cosentini@gmail.com

Aims: To discuss controversies in the management of patients with community-acquired pneumonia and to evaluate guidelines for answering the simple and unresolved questions that physicians may have in daily clinical practice.

Programme:

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 to 7:10</td>
<td>Introduction from the chair</td>
<td></td>
</tr>
<tr>
<td>7:10 to 7:35</td>
<td>What and how should be implemented in the management of CAP patients</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prof. Mark Andrew Woodhead</td>
<td></td>
</tr>
<tr>
<td>7:35 to 8:00</td>
<td>Impact of guidelines in the outcomes of CAP: the evidence</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Prof. Antoni Torres</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Answers to MCQs</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Faculty Disclosure</td>
<td>37</td>
</tr>
<tr>
<td>8:00 to 8:15</td>
<td>Discussion</td>
<td></td>
</tr>
</tbody>
</table>
Impact of guidelines in the outcomes of CAP: the evidence
Prof. Antoni Torres

Summary
Mortality of CAP is still very high ranging from 7 to 15% in hospitalized patients and reaching up to 30-40% in patients admitted in the ICU. Some authors have released the concept of considering CAP as a medical emergency with the aim to decrease this unacceptable mortality. In the last years several USA and European Societies have published guidelines with the final aim of improving the different outcomes of CAP. Several studies have demonstrated that the implementation of CAP guidelines has a beneficial effect. Of course guidelines are composed of several recommendations and it is difficult to implement all of them. Usually, the different studies refer to adherence of antibiotic treatment recommendations and time to the first dosage as the main management interventions. Other parameters are more difficult to study. In relation to these two recommendations retrospective and prospective studies show improvements in shortening the period to clinical stability, percentage of complications, length of stay and mortality. Consequently, there is no doubt that implementing part or total of the components of guidelines will be beneficial for patients. At least one study suggests that adherence to guidelines is related to the speciality involved in the development of these guidelines. For these reason when developing guidelines it is very recommendable to involve all the specialities that potentially may deal with CAP.

There are several reasons that have to be taken into account to explain no adherence to guidelines as follows: 1-A lack of knowledge and update by clinicians, 2-epidemiological local differences compared to guidelines, 3-unfrequent clinical situations (host factors or unusual microorganism) and finally, 4-disagreement with specific recommendations.

In conclusion it is evident that implementation of CAP guidelines is followed by better outcomes, particularly in hospitalized patients. Efforts have to be done to adapt guidelines for local implementation. After local implementation a follow-up team is required to overcome problems and barriers and maintain adherence to optimal levels.

Evaluation
1. Which of the following guideline components is associated to lower mortality in CAP?
   a. Performing blood cultures
   b. Intravenous administration of antibiotics
   c. Time to the first dosage of antibiotics
   d. Duration of antibiotic treatment
   e. Administration of corticosteroids

2. All of the following except one have been shown improved in CAP after guideline implementation:
   a. Length of stay
   b. One year mortality
   c. In-hospital mortality
   d. Time to clinical stability
   e. Days of intravenous therapy

3. Which of the following should not be a barrier for a local implementation of a CAP guideline?
   a. Different local epidemiology
   b. Disagreement point of view
   c. Lack of knowledge
   d. Lack of resources
   e. A negative perception of guidelines
4. What of the following parameters is not included in the concept of clinical stability?
   a. Temperature
   b. Oxygen saturation
   c. Respiratory rate
   d. Central venous pressure
   e. Heart rate

   Please go to the end of the document for the answers
Guidelines of CAP: Impact in the Clinical Practice

A. Torres
University of Barcelona
Hospital Clinic.Barcelona

One of the most frequent and severe acute diseases is pneumonia: "The Captain of the Men of Death"
The concept

Community-acquired pneumonia as an emergency: time for an aggressive intervention to lower mortality

Adapted from Gilbert K, Fine MJ: Sem Respir Inf 1994; 9:140-52

The Objective

MORTALITY OF CAP in HOSPITAL

These mortality figures seem impressively high. Mortality rates of hospitalized CAP patients judged to be at intermediate risk still parallel mortality rates in patients with STEMI. Even more striking is the high excess mortality rate in survivors of CAP, reaching >50% within 5 yrs [7-10].
**Guidelines: Strengths and Limitations**

- Update knowledge, epidemiological data and studies to develop recommendations
- Improve care and prognosis
- Reduce variability in care
- They help in prevention

- There is no evidence of level A for all recommendations
- Each community, country and population is different
- Controversy on how to evaluate their effect
- They cannot cover all situations

---

**Pneumonia and Mortality**

- Initial Severity
- Associated Comorbidity
- Causal Microorg
- Severe Sepsis

To Identify Severity
Adequate Antibiotic Treatment
Early Treatment
Treatment of Sepsis
**Guidelines: Theoretical recommendations or best clinical practice?**

The best management to reduce mortality

As early as possible

**Decrease of mortality after CAP guidelines implementation**

- Implementation:
  - Admission decision
  - Early AB treatment
  - Ab Selection
  - Heparin prophylaxis

- Period: 1993-1997

- 23 hospitals and 60 primary care centers
- 28,000 CAP
- Adjustment of results:
  - Age, Genre
  - Type of Hospital
  - Year

Mortality and Guidelines


Guidelines
No Guidelines

Preintervention N:377
Postintervention N:417

Results post-intervention

1. Adequate AB Treat
2. Coverage of atypicals
3. Days of Ab Treat
4. % ICU admission
5. Ab Treat < 8 hours
Impact of Guidelines Implementation

<table>
<thead>
<tr>
<th></th>
<th>Pre-int</th>
<th>Post-int</th>
<th>H control</th>
<th>H control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Mort*</td>
<td>9.4%</td>
<td>7.4%</td>
<td>8.4%</td>
<td>10.7%</td>
</tr>
<tr>
<td>30 day Mort*</td>
<td>10.5%</td>
<td>8.9%</td>
<td>9.4%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Readmission</td>
<td>1.9</td>
<td>2.4</td>
<td>1.2</td>
<td>2.6</td>
</tr>
<tr>
<td>LOS</td>
<td>7.3</td>
<td>5.7</td>
<td>6.1</td>
<td>8.8</td>
</tr>
</tbody>
</table>

* p<0.05

Capelastegui CID 2004:39:956

Adherence to empirical antibiotic treatment

Adherence to Antibiotic Treatment and Mortality

Menéndez R et al. Chest 2002; 122:612
Adherence and Speciality

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Adh %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other specialist</td>
<td>85</td>
</tr>
<tr>
<td>Pulmonol</td>
<td>83</td>
</tr>
<tr>
<td>Other Resi</td>
<td>83</td>
</tr>
<tr>
<td>Pulmo Resi</td>
<td>64</td>
</tr>
</tbody>
</table>

Adherence to Guidelines and Mortality

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Adh</th>
<th>No adh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonol</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Other Specialty</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Pulmonol Resi</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Other Resident</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

No Adherence and Physician

<table>
<thead>
<tr>
<th>Physician Type</th>
<th>Death</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonology</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>Pulmonology Resident</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Other Resident</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Other Specialists</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>90</td>
</tr>
</tbody>
</table>
Adherence and death at 48 hours

- 787 patients
- Mean age: 60
  - 79% males
- 20% ICU
- 48 hour deaths
  - 20
- Risk Reduction OR: 0.37

Mortensen et al. AjM 2006; 119:859

Guidelines in a Rural Hospital

- Study of the Chilean Pneumonia Clinic (2005)
  - Guideline recommendations in 96 patients
    a) Evaluation of severity and admission
    b) Empirical antibiotic treatment
    c) In-hospital follow-up
    d) Treatment failure follow-up
    e) Early oral switch and early discharge
- Mortality 6.2%
- Switch to oral: 3 days
- Duration of hospitalization 5 days


Guidelines and ICU

- 53 (41%) received adherent treatment
- No adherence was associated with higher in-hospital mortality
  - 25% vs 11%; odds ratio: 2.99, 1.08-9.54
- Adherence treatment was not associated with:
  - Time to stability
  - Time to oral treatment
  - Length of stay

Early Antibiotic Treatment

“Time matters”

Antibiotic Treatment within the first 4 hours and Prognosis

• Retrospective Study
  – 13,771 patients >65 años
  – Deaths within 24 h excluded

• Outcome Variables:
  – In-hospital death and 30 days
  – Readmission
  – LOS

• Adjustment:
  – PSI, ICU, Bacteremia and Sa O2

Houck PM. Arch Inter Med 2004; 164: 637-44

Results: Time to first AB and Death*

15% reduction mortality

OR: 0.87

*In patients without previous antibiotic treatment
MORTALITY ACCORDING TO Nº ORGANS IN FAILURE

Adequate treatment and timing in shock

- N: 5,500 patients with septic shock
  - Survival: 43%
  - Trat. AB Appropriate: 80%
- Survival according with the adequacy of the treatment
  - 52 vs. 10%
- Multivariate: Non Adh Treatment adjusted by comorbidity and other
  - Less Survival: OR 8.9 (6.6-12)

Greater survival with early treatment

Kumar. Early antimicrobial therapy in severe sepsis and septic shock.
Curr Infect Dis Rep 2010; 12: 336-44

Adherence AB and timing (6 h)

Menendez R et al. NAC calidad group. ERJ 2012
Editorial. Waterer ERJ 2012
GUIDELINES AND CLINICAL STABILITY


**Clinical stability:**
- T < 37.2
- RR < 24
- HR < 100
- SBp > 90
- Sa O2 > 90%

**Factors Associated with Clinical Stability**

**Uni and multivarite analyses**

<table>
<thead>
<tr>
<th>Factor</th>
<th>HR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispnea</td>
<td>0.76 (0.6-0.8)</td>
</tr>
<tr>
<td>Multiobar</td>
<td>0.72 (0.6-0.8)</td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>0.67 (0.5-0.9)</td>
</tr>
<tr>
<td>PSI</td>
<td>0.73 (0.6-0.8)</td>
</tr>
<tr>
<td>Adherence to SEPAR Guideline</td>
<td>0.22 (1.04-2.44)</td>
</tr>
</tbody>
</table>

**Adherence Prior Ant Treat**

- Yes
- No

**Days to stability**

- Final
- Final I
- Final II
- Final III
- Final IV
- Final V

**Adherence Prior Ant Treat**

Day of stability

- 0
- 1
- 2
- 3
- 4


33
Reasons for no Adherence

- A lack of knowledge and update by clinicians
- Epidemiological local differences compared to guidelines
- Unfrequent clinical situations: Host factors or unusual microorganism
- Disagreement by physicians

Adherence to recommendations according to patient factors

Impact of CAP Guidelines

- They are useful in clinical practice
- Adherence is followed by:
  - Lower mortality
  - Shorter LOS
  - Shorter period to clinical stability
- They have to be locally adapted and followed-up
Faculty Disclosures

No faculty disclosures for this session.
Impact of guidelines in the outcomes of CAP: the evidence - Prof. Antoni Torres

1. Which of the following guideline components is associated to lower mortality in CAP?
   a. Performing blood cultures
   b. Intravenous administration of antibiotics
   c. **Time to the first dosage of antibiotics**
   d. Duration of antibiotic treatment
   e. Administration of corticosteroids

2. All of the following except one have been shown improved in CAP after guideline implementation:
   a. Length of stay
   b. **One year mortality**
   c. In-hospital mortality
   d. Time to clinical stability
   e. Days of intravenous therapy

3. Which of the following should not be a barrier for a local implementation of a CAP guideline?
   a. Different local epidemiology
   b. Disagreement point of view
   c. Lack of knowledge
   d. Lack of resources
   e. A negative perception of guidelines

4. What of the following parameters is not included in the concept of clinical stability?
   a. Temperature
   b. Oxygen saturation
   c. Respiratory rate
   d. **Central venous pressure**
   e. Heart rate