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Website:
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DOI:
10.4103/ejop.ejop_37_18

The approach to community-acquired pneumonia: A survey study

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Abstract:

INTRODUCTION AND AIM: Community-acquired pneumonia (CAP), which is often seen in daily practice, is a lower respiratory tract and pulmonary parenchyma infection which develops in society and daily life with community-acquired pathogens in individuals with no known immune failure. Delay in the treatment of pneumonia is known to increase morbidity and mortality. Various scoring systems are currently used in the identification of treatment groups in pneumonia. With the aim of evaluating the approach to CAP cases, the infection.

MATERIALS AND METHODS: Working Group of the Turkish Respiratory Research Association (TUSAD) prepared a 22-item questionnaire.

RESULTS: The survey was published on the TUSAD official website between July 2013 and June 2016. A total of 78 individuals responded to the questionnaire on the website.

CONCLUSION: The responses to the questionnaire could indicate the way forward for new guidelines for physicians in respect of the approach to CAP.

Keywords:

Compliance with guidelines, pneumonia, survey

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Introduction

Community-acquired pneumonia (CAP), which is often seen in daily practice, is a lower respiratory tract and pulmonary parenchyma infection which develops in society and daily life with community-acquired pathogens in individuals with no known immune failure. Incidence and mortality rates increase with age. The annual incidence of pneumonia varies between 0.28% and 1.16%.^[1] Approximately, one-third of the patients are hospitalized, and two-thirds are treated as outpatients.^[2] In Turkey, lower respiratory tract infection is ranked 5th at 4.2% as a cause of death.^[3]

Variability may be seen in CAP patients according to the severity and course of the disease. The mortality rate of patients

requiring outpatient follow-up is 1%, and 5%–15% in those requiring hospitalization. In patients followed up in the Intensive Care Units (ICUs) requiring mechanical ventilator support, the mortality rate is 25%, and this rate increases to 50% in patients who need vasopressor treatment.^[4]

It is known that a delay of even 4–6 h in the treatment of pneumonia increases morbidity and mortality.^[5] Therefore, it is important that appropriate antibiotics are started as soon as possible. However, microbiological studies have determined the agent in only half of the patients.^[6] Moreover, agent isolation takes 24–48 h and an appropriate sample cannot be obtained from every patient. For all these reasons, pneumonia treatment is started empirically. In the initiation of empirical antibiotic treatment, it is important to know the type, frequency and resistance rates of CAP agent microorganisms in the

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How to cite this article: Ozyürek BA, Erturk A, Aydemir Y, Sen N, Alizoroglu D, Ozhan MH. The approach to community-acquired pneumonia: A survey study. *Eurasian J Pulmonol* 2018;20:93-8.

community. With national and international studies, the agent pathogen frequencies and resistance rates have been identified according to patient groups and in the light of these results, guidelines have been published and recommendations for the selection of suitable antibiotics have been presented. In the treatment of pneumonia, usually, the guidelines used are those of the Turkish Thoracic Association (TTA), the Infectious Diseases Society of America/American Thoracic Society, the European Respiratory Society, and the National Institute for Health and Care Excellence. In respect of the success of empirical antibiotic treatment, and reducing treatment costs and the development of resistance, compliance with the guidelines is extremely important in CAP.

The aim of this study was to evaluate the treatment approach to CAP of physicians and the rate of use and compliance with the guidelines.

Materials and Methods

To evaluate the approach to CAP and show compliance with the guidelines, a 22-item questionnaire was prepared by the Infection Working Group of the Turkish Respiratory Research Association (TUSAD) [Table 1].

The questionnaire was published on the TUSAD official website from July 2013. Members of TUSAD were informed by E-mail that the questionnaire could be accessed on the website. Responses received up until June 2016 were taken into consideration for this study.

Table 1: Questionnaire

1. What is your area of specialism?
2. How old are you?
3. Where do you work?
4. What is your position at your place of work?
5. How long have you been working as a physician?
6. On average, how many cases per month do you encounter of lower respiratory tract infection?
7. On average, how many cases per month do you encounter of CAP?
8. When evaluating pneumonia cases, do you use a scoring system?
9. If you have answered "yes" to Questionnaire 8, which scoring system do you use?
10. When deciding on treatment, do you use guidelines?
11. If you have answered "yes" to Questionnaire 10 which guidelines do you use?
12. Do you think that the guidelines meet current requirements?
13. What is your first test request for a patient with a preliminary diagnosis of pneumonia?
14. Do you request routine sputum culture for patients diagnosed with pneumonia?
15. What would be your first choice of antibiotic for a case of a 36-year-old patient with CAP with lobe infiltration, no comorbidity, no antibiotic use within the last month, and no history of hospitalization in the last 3 months? (mark one only)
16. Do you use biological biomarkers in the follow-up of pneumonia?
17. Which biological biomarkers do you use?
18. What is the average duration of antibiotherapy for your CAP patients?
19. Do you use antiviral agents in treatment?
20. In 2012-2013 how many patients with proven H1N1 diagnosis proven with PCR did you follow-up?
21. Do you recommend pneumococcal vaccination for risk groups?
22. If you answered "yes" to Questionnaire 21, do you prefer pneumococcal polysaccharide vaccination or conjugated vaccination?

CAP: Community-acquired pneumonia, PCR: Polymerase chain reaction, H1N1: Influenza A

The study protocol was prepared in accordance with the Helsinki Declaration of the World Medical Association.

Statistical analysis

Nonparametric tests were used in the statistical analyses of this study.

Results

A total of 78 physicians responded to the questionnaire on the website between July 2013 and June 2016.

The respondents comprised 94.7% thoracic diseases physicians, and 1.28% were internal diseases physicians. The mean age of respondents was 40 ± 6.53 years (range, 26–57 years).

Of the total respondents, 50.65% worked in university hospitals and 28.57% in training and research hospitals.

The respondents comprised 36.36% with academic status as lecturers, 51.95% were specialists, and 11.69% were research assistants.

The mean duration as a medical doctor was 16.7 years.

Of the total respondents, 32.05% reported treating 6–10 cases of pneumonia per month, 21.79% reported 11–20 cases per month, 19.23% 0–5 cases, 15.38% 21–30 cases, 8.97% 31–40 cases, and 2.56% >41 cases.

When evaluating pneumonia cases, 62 (79.49%) of respondents stated that they used a scoring system. Of these 62 who responded positively, 98.39% ($n = 61$) used the CURB-65 scoring system and 25.81% ($n = 16$) used the Pneumonia Severity Index (PSI).

When making a treatment decision, 87.18% ($n = 68$) of the respondents used pneumonia guidelines. The Turkish Thoracic Association, Pneumonia Diagnosis, and Treatment Report 2009 were used by 91.30% ($n = 63$) [Graph 1].

57.33% of the respondents stated that the guidelines met current needs.

In the diagnosis of pneumonia, 75 physicians first requested pulmonary radiographs, and 3 requested a full blood count.

At the time of diagnosis of patients with pneumonia, 34.62% ($n = 27$) of physicians requested a routine sputum culture [Graph 2]. Of the physicians who requested a routine sputum culture before treatment, 74% worked at a university hospital.

In a case of a 36-year old patient with CAP with lobe infiltration, no comorbidity, no antibiotic use within the last month, and no history of hospitalization in the last 3 months, 31.58% ($n = 24$) of the physicians who responded to the survey stated that their first choice in treatment would be amoxicillin/clavulanic acid, 23.68% ($n = 18$) stated ampicillin-sulbactam and clarithromycin combination and 19.74% ($n = 15$) stated clarithromycin alone [Graph 3]

The mean duration of treatment was found to be 10 days.

In patient follow-up, all the physicians used C-reactive protein (CRP) as a biomarker and 18.9% selected procalcitonin.

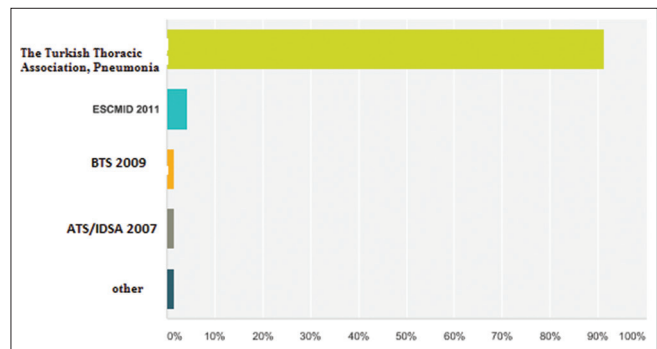
Between 2012 and 2013, 32 physicians stated that they had followed up at least 2 and a maximum of 18 patients with H1N1 diagnosis proven with polymerase chain reaction.

Antiviral agents were stated to have been used in pneumonia treatment by 63.38% of the respondents.

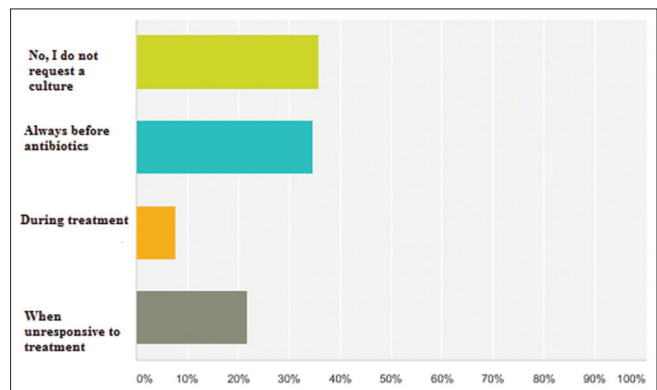
Pneumococcal vaccine had been recommended for at-risk groups by 74 physicians, with polysaccharide vaccination the most preferred (54.79%).

Discussion

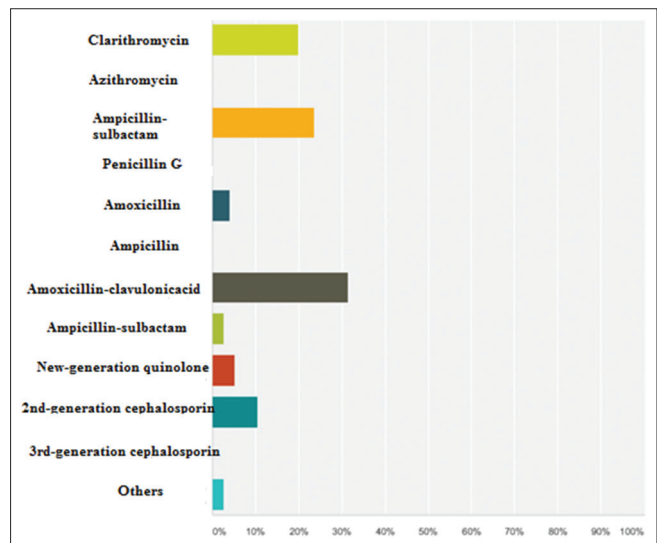
CAP is responsible for a considerable proportion of presentations at physicians, treatment costs, absences



Graph 1: Which guidelines do you use?



Graph 2: Do you request a routine sputum culture for patients diagnosed with pneumonia?



Graph 3: What would be your first choice of antibiotic for a case of a 36-year old patient with community-acquired pneumonia with lobe infiltration, no comorbidity, no antibiotic use within the last month and no history hospitalization in the last 3 months? (Marks one only)

from school and work, and mortality worldwide.^[7-13] The microbiological etiology in CAP may show differences associated with conditions such as risk factors, patient age, and comorbid diseases. Treatment is generally started empirically. When making the diagnosis and

treatment decision in CAP, there is a need for various algorithms and guides. Studies conducted after the use of guidelines started have revealed that these guidelines changed physicians' behavior on the subject of diagnosis and treatment, increased the success of treatment and decreased hospital stay, treatment costs, and mortality rates.^[14-18]

Correct diagnosis and treatment approaches for CAP were first defined in Turkey in 1998 in the "Diagnosis and Treatment Guidelines for CAP in Adults" which was published by the Turkish Thoracic Association and updated in 2002 and 2009. According to the results of the survey, 87.18% ($n = 68$) of the participating physicians stated that they used pneumonia guidelines when making the treatment decision and of those, 91.30% ($n = 63$) used the Turkish Thoracic Association Guidelines.

Studies related to compliance with guidelines have shown compliance to vary between 24% and 84.2%.^[18,19] Guideline compliance was determined as 88.4% in the current study. Previous studies of patients hospitalized with pneumonia have evaluated the effect on mortality of guideline compliance and determined that the use of guidelines reduced the 48-h and 30-day mortality rates.^[20,21] In the current study, 57.33% of the respondents stated that the guidelines met current requirements. There is a clear need for new guidelines, and these are being prepared.

In the guidelines published in recent years, treatment options are recommended by grouping the severity of the disease with various scoring methods.^[22] CURB-65 and PSI scores are the most frequently used. In the CAP diagnosis and treatment guide, most commonly used in Turkey, hospitalization and treatment decisions are made using these scores.

When evaluating pneumonia cases, 79.49% ($n = 62$) of the respondents stated that they used a scoring system. This was the CURB-65 system by 98.39% and the PSI scoring system by 25.81%. As the CURB-65 is simple and easier to apply, it is often implemented even in Level 1 treatment centers.^[1] In the current study, CURB-65 was determined to be more often used. PSI is a detailed scoring system, more difficult to keep in mind. In a study of 144 pneumonia inpatients undergoing treatment, Cömert *et al.* compared scoring methods and showed a correlation between the three pneumonia severity scoring systems that are most used in daily practice in respect of evaluating the need for hospitalization. These 3 systems were the PSI, CURB-65 and the TTA Pneumonia Severity Grouping. However, the PSI was determined to be insufficient for the determination of the probability of ICU indications.^[23]

In patients with suspected pneumonia from symptoms and physical examination findings, a pulmonary radiograph should be taken first if possible. The pulmonary radiograph is of assistance to the physician both in the diagnosis of the disease and in the determination of comorbidities and complications (abscess, empyema, pneumothorax, tumor, etc.).^[1] In the current study, 96.15% of respondents stated that they requested a pulmonary radiograph first in pneumonia diagnosis and three physicians requested a full blood count.

In the evaluation of the response to treatment in pneumonia and the prediction of prognosis, CRP and procalcitonin are used as biomarkers. Following pneumonia treatment, a continuous decrease in CRP level indicates a good response to treatment, while the reverse can show that the response has not been good. A decrease of 40%–50% or more in the CRP level on the 4th day shows a good response to treatment.^[24,25] Procalcitonin is used in particular for the decision to start antibiotics. Previous studies have recommended that when procalcitonin is <0.1 mcg/L, antibiotics are not used and at a level of >0.25 mcg/L, they are used.^[26] In the responses to the current survey, all the physicians stated that they used CRP as a biomarker in patient follow-up and 18.9% preferred procalcitonin.

Microscopic examination of sputum or other samples obtained from the lower respiratory tract is helpful in diagnosis. Sputum culture should be performed in patients requiring hospitalization. In those treated as outpatients, sputum culture is recommended when there is no response to the first treatment. When antibiotic therapy has been started, when sputum or mucous cannot be obtained from the patient or is not of sufficient quality, when there is a delay in reaching the laboratory, the diagnostic and treatment guidance value is reduced of the sputum culture that should be reported on in 24–48 h. In approximately half of the CAP cases, the agent cannot be determined.^[22] Nevertheless, 34.62% of the physicians responding to the survey stated that they routinely requested sputum culture for pneumonia patients. This low rate could be due to sputum examination not being applied to outpatients. The majority of the physicians requesting sputum culture were working in university hospitals. This finding may be related to the better laboratory testing facilities in universities. Sputum culture results are extremely important in patients where the response to treatment is insufficient, and the expected clinical improvement has not been obtained.

In national and international guidelines, the use of narrow spectrum and inexpensive drugs is recommended as far as possible to both reduce treatment costs and prevent the development of antibiotic resistance.

In a case of a 36-year-old patient with CAP with lobe infiltration, no comorbidity, no antibiotic use within the last month, and no history of hospitalization in the last 3 months, 31.58% ($n = 24$) of the physicians who responded to the survey stated that their first choice in treatment would be amoxicillin/clavulanic acid, 23.68% ($n = 18$) stated ampicillin-sulbactam, and clarithromycin combination and 19.74% ($n = 15$) stated clarithromycin alone.

Of the total respondents, 42.1% were working in a university hospital and 31.7% ($n = 18$) in a Training and Research Hospital. These results with a preference for cost-effective and appropriate spectrum antibiotics shows that this rate was higher in universities and compliance with the guidelines was found to be at the rate of 88.4%.

The duration of treatment in CAP is recommended to be continued for 5–7 days following a drop in temperature. Depending on the severity of the disease at onset, the type, and virulence of the agent responsible, the presence or not of comorbidities or bacteremia and the individual response of the host, there may be changes in the treatment duration. If the agent is determined, the treatment duration should be 7–10 days for pneumococcal pneumonia, 10–14 days for *Mycoplasma* and *Chlamydia* pneumonia, and 14–21 days for *Legionella* pneumonia. In cases of severe pneumonia when the agent cannot be determined, the treatment duration should not be <2–3 weeks.^[22] If a response has been obtained within 3 days in patients who have started empirical treatment, the patient should be reevaluated. In the responses to this survey, the mean treatment duration was found to be 10 days.

Viral agents may also cause pneumonia. In Turkey as throughout the world, influenza epidemics (H1N1, H5N1) in the recent years, in particular, have led to an increase in the number of pneumonia attacks and a significant increase in mortality. The increasing mortality rates have shown the necessity of starting empirical antiviral agents in suspicious cases. A total of 63.38% of the survey respondents stated that because of epidemics in Turkey, they used antiviral agents in pneumonia treatment.

The most commonly isolated agent in adult pneumonia is *Streptococcus pneumoniae*. Vaccinations are recommended for high-risk groups. There are two types of pneumococcal vaccination; polysaccharide vaccination and conjugated vaccination which has been increasingly used in recent years. Compared to the polysaccharide vaccination, the conjugated vaccination creates a longer lasting immune response with a high antibody level. A total of 74 physicians stated that they recommended

pneumococcal vaccination to high-risk groups, and polysaccharide vaccination was most commonly preferred (54.79%). This finding can be explained by the higher cost of the conjugated pneumococcal vaccination compared to polysaccharide, and this cost would not be met by the national social security agency. The future inclusion of conjugated pneumococcal vaccination into the state payment system would make the use more widespread and would change the preferences of physicians.

A major limitation of this study is that in a 3-year period, only 78 physicians responded to the questionnaire. This could be related to lack of interest in surveys and questionnaires because of a lack of time under intense working conditions.

Conclusion

Diagnostic and treatment guidelines for pneumonia patients are of guidance for physicians. The initiation of treatment appropriate to the guidelines has been shown to increase treatment success, contribute to the prevention of antibiotic resistance, and decrease morbidity and mortality. Therefore, compliance with the guidelines is extremely important in respect of both increasing treatment success and reducing healthcare costs. In the responses to the survey, the use of guidelines in the treatment of pneumonia was determined at 87.18% and compliance to the guidelines at 88.4%. Providing easy access to the guidelines for physicians, providing regular training related to the treatments recommended, and keeping compliance to the guidelines as a current topic would be useful.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Özyürek, et al.: Pneumonia survey study

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