Fever in Pediatric Complicated Pneumonia

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The persistence of fever 72 hours after starting antibiotic therapy in pediatric community-acquired pneumonia (CAP) is, according to the guidelines, a criterion for clinical reassessment and the possible use of complementary diagnostic studies.[1,2] Despite a reduction in the incidence and number of hospitalisations by CAP in high-income countries since the introduction of pneumococcal conjugate vaccines,[3-7] the severity and frequency of complications (pleural effusion, empyema, lung abscess, necrotisation) have increased, usually associated with a longer duration of fever.[7]

However, there are no clear guidelines for diagnostic and therapeutic guidance, and persistent fever is known to induce drug prescription.[8]

This study aimed to evaluate the duration of fever in hospitalised children with CAP as a marker of complications and a prescription inducer.

54 medical records of hospitalised children aged ≥ 24 months with a diagnosis of CAP (from February 2012 to July 2014) were reviewed. Patients with chronic diseases (neuromuscular diseases, cystic fibrosis and immunodeficiency) were excluded.

A descriptive analysis of the demographic and clinical variables, complementary studies and prescription of antibiotic therapy were performed. A bivariate association analysis of the duration of fever (< 72 hours and ≥ 72 hours) with complicated and uncomplicated CAP was made using chi-square and Fisher's exact tests for categorical variables and Mann-Whitney U test for the comparison of means, with a significance level of 5% (IBM SPSS® v20.0).

The demographic characterisation, the therapeutic interventions and aetiological results of the cases of children in the study can be found in Table 1.

Complicated CAP patients had a significantly longer duration of fever during their hospitalisation (7 days vs 1

Table 1. Demographic characteristics. Description of therapeutic interventions and aetiological results of the cases of the study (n=54)

Males, n (%)	24 (44.4)
Age in years, median (minimum-maximum)	4 (2-15)
Antibiotic therapy started on admission	
Ampicillin, n (%)	33 (61.1)
Amoxicillin/clavulanic acid, n (%)	14 (25.9)
Complications, n (%)	22 (40.7)
Pleural effusion, n (%)	15 (68.2)
Empyema, n (%)	6 (27.3)
Necrotisation, n (%)	5 (22.7)
Intervention	
Thoracentesis, n (%)	14 (66.7)
Pleural drain, n (%)	11 (52.3)
Bacterial identification, n (%)	6 (11.1)
Blood culture, n (%)	3 (5.6)
Streptococcus pneumoniae, n (%)	1 (1.9)
Haemophilus influenzae, n (%)	1 (1.9)
Streptococcus agalactiae, n (%)	1 (1.9)
Positive polymerase chain reaction for *Streptococcus pneumoniae* in pleural fluid, n (%)	3 (5.6)

h – hours; CAP – community-acquired pneumonia.

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day, p < 0.001), duration of fever on antibiotic therapy (8.5 days vs 1 day, p = 0.001) and a total duration of fever (14 days vs 4 days, p < 0.001). In the complicated CAP group, persistent fever was observed at 72 hours of hospitalisation in 81.8% compared with 15.6% in the uncomplicated CAP group (p < 0.001) (Fig. 1). In a total of 54 cases of community-acquired pneumonia, 23 (42.6%) had fever at 72 hours of hospitalisation – 18 (78.3%) with complicated CAP – and antibiotic therapy switch was more frequent in this group (52.2% vs 16.1%, p = 0.06). The group with fever ≥ 72 hours had a greater number of chest x-rays (median 5.5 vs 1, p = 0.003) and laboratory evaluations (median 2 vs 1, p = 0.013).

Overall, 26 children required oxygen therapy, with a median duration of 3 days (minimum of 2 days, maximum of 8 days), without significant differences between uncomplicated and complicated CAP. The hospital stay was longer in the complicated CAP group (13 days vs 4 days, p < 0.001).

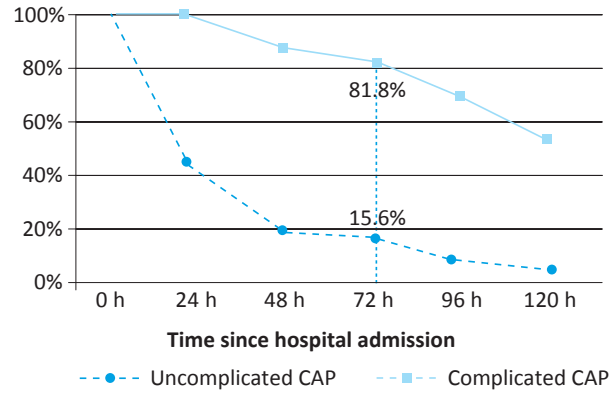
The high proportion of complicated CAP described in this study is a consequence of the current trend of outpatient treatment of uncomplicated CAP patients with no hypoxaemia and who can tolerate oral therapy.[5-7]

A longer duration of fever in complicated CAP was associated with greater use of complementary studies and increased frequency of antibiotic therapy switch. This longer duration of fever in complicated CAP can be explained by the inflammatory nature of the underlying process,[7] and it does not necessarily imply therapeutic failure.

This study shows that the duration of fever is significantly longer in cases of complicated CAP, including at 72 hours of hospitalisation, and supports the current guidelines determining a greater number of diagnostic and therapeutic interventions, but does not warrant or support antibiotic therapy switch.[1,2,9]

Pediatric CAP is predominantly pneumococcal in aetiology. The aetiological identification rate in this study was low, similar to that described in the literature, as it is mostly a non-invasive disease,[2-4] and the local prevalence of antibiotic resistance is also low.[10]

In the absence of other signs of clinical worsening, antibiotic therapy switch is not warranted and may contribute to increasing antibiotic resistance.[10]



h – hours; CAP – community-acquired pneumonia.

Figure 1. Defervescence curve in hospitalisation. Comparison of complicated and uncomplicated CAP in terms of number of cases with persistent fever in each day. The rate of persistent fever at 72 hours of hospitalisation is highlighted and compared, p < 0.001.

Keywords: Child; Community-Acquired Infections; Fever/drug therapy; Pneumonia/complications

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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Protection of human and animal subjects

The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

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