



Contents lists available at ScienceDirect

## International Journal of Pediatric Otorhinolaryngology

journal homepage: [www.elsevier.com/locate/ijporl](http://www.elsevier.com/locate/ijporl)

## Hospital cost analysis of children with preseptal cellulitis

İlknur Çağlar\*, Cansu Kafes, Mine Korcum, Mine Düzgöl, Ahu Kara, Süleyman Nuri Bayram, Hurşit Apa, İlker Devrim

Department of Pediatric Infectious Diseases, Dr. Behçet Uz Children's Hospital, İzmir, Turkey



## ARTICLE INFO

## Keywords:

Preseptal cellulitis  
Cost  
Children  
Length of stay  
Sinusitis

## ABSTRACT

**Objective:** Hospitalization of the children with preseptal cellulitis creates a burden on healthcare costs. This study aimed to analyze the hospital costs for preseptal cellulitis and determine the factors contributing.**Methods:** Children, between 1 and 18 years old, who were admitted to hospital for preseptal cellulitis from May 2013 to December 2016 were included in the study. Patients were divided into groups by age (under or equal to five years and older than five years) and by the presence of sinusitis. Demographics, length of stay and total and categorical hospital costs were evaluated retrospectively.**Results:** The study included 54 patients with a mean age of 5 years. Thirty one of the patients were under five years of age. The most common symptoms were swelling (94.4%) and redness (83.3%) around eye. Among the predisposing factors, sinusitis was the most common one (37%). The average length of stay was 4.5 days. Total hospital cost of all patients was \$11,841. Antibiotic costs (37%) and inpatient floor costs (36%) were the greatest expenditures. Between age groups, length of stay was longer, and inpatient floor and antibiotic costs were significantly higher in the group of > 5 years ( $p = 0.007$ ,  $p = 0.004$  and  $p = 0.001$ , respectively). In the group with sinusitis, length of stay was longer, and all hospital costs were significantly higher compared to the group without sinusitis ( $p < 0.001$ ). There was a strong, positive correlation between length of stay and hospital costs ( $r = 0.854$ ,  $n = 53$ ,  $p < 0.001$ ). Sinusitis was a significant factor ( $p < 0.001$ ) for longer length of stay, but age was not ( $p = 0.841$ ).**Conclusion:** Sinusitis was found to be an important factor contributing to longer length of stay and higher hospital costs for preseptal cellulitis. Oral or ambulatory intravenous antimicrobial treatment strategies might decrease the hospital expenditure in these patients; however care should be taken in the presence of sinusitis.

## 1. Introduction

Preseptal cellulitis (PC) is an infection of the eyelid and periorbital soft tissue which is bounded by orbital septa from the orbital structures. When the infection is posterior to the orbital septum it is defined as orbital cellulitis (OC), and can lead to life threatening complications [1–4]. Although PC is much more common and a mild condition, sometimes it can be difficult to distinguish it from OC; since erythema, swelling and ocular pain are common initial findings of both conditions [3]. Thus children with PC may require hospitalization to administer intravenous antibiotic therapy and further investigation which might result in extra health care cost burden.

There is a close relationship between sinuses and orbital walls. In the presence of sinusitis, even it is usually a self-limiting condition, infection can spread to periorbital and orbital structures [5]. Sinusitis occurs mostly following upper respiratory infections which are frequent

as 14 times per year in preschool children [6]. So sinusitis stands as an important risk factor for both PC and OC [4,5,7,8].

The aim of this study is to find out the total and categorical hospital costs of the patients with PC and associated contributing factors including sinusitis and age. Up to our knowledge, this is the first study focusing on hospital costs of PC in children.

## 2. Methods

Fifty four patients with PC diagnosis, between the ages 1–18 years, who were admitted to Pediatric Infectious Diseases Department of Dr. Behçet Uz Children's Hospital from 1 May 2013 to 31 December 2016 were included. The study was approved by local ethical committee. The patients were identified using both hospital and unit-specific databases. Demographic and clinical features with hospital costs and length of stay were evaluated retrospectively and recorded on a registry form. The

\* Corresponding author.

E-mail addresses: [dr\\_ilknur@yahoo.com](mailto:dr_ilknur@yahoo.com) (İ. Çağlar), [dr.cansukafes@gmail.com](mailto:dr.cansukafes@gmail.com) (C. Kafes), [minekorcum@hotmail.com](mailto:minekorcum@hotmail.com) (M. Korcum), [mineduzgol@gmail.com](mailto:mineduzgol@gmail.com) (M. Düzgöl), [ahukara01@hotmail.com](mailto:ahukara01@hotmail.com) (A. Kara), [nuribayram@gmail.com](mailto:nuribayram@gmail.com) (S.N. Bayram), [hursitapa@icloud.com](mailto:hursitapa@icloud.com) (H. Apa), [ilkerdevrim2003@yahoo.com](mailto:ilkerdevrim2003@yahoo.com) (İ. Devrim).<https://doi.org/10.1016/j.ijporl.2018.01.007>

Received 31 July 2017; Received in revised form 9 January 2018; Accepted 10 January 2018

Available online 02 February 2018

0165-5876/ © 2018 Elsevier B.V. All rights reserved.

costs were divided into categories as inpatient floor, laboratory, imaging, antibiotic and other treatment. All costs were calculated in dollar for the month December 2016. Patients were divided into groups by age (under or equal to five years and older than five years) and then by the presence of sinusitis. Hospital costs, length of stay and contributing factors were compared between these groups.

### 2.1. Diagnosis

Diagnosis of the patients was mostly based on clinical symptoms and signs. Preseptal cellulitis was diagnosed when there were just lid edema with warmth and tenderness without restricted ocular movements, proptosis, loss of vision and relative afferent pupillary defect, which are indicators of orbital cellulitis [7]. Sinusitis was diagnosed when at least three of the following symptoms and signs were present: 1) Discoloured discharge with unilateral predominance, 2) Purulent secretion in the cavum nasi, 3) Severe local pain with unilateral predominance, 4) Fever of more than 38 °C, 5) Elevated erythrocyte or C-reactive protein, 6) Deterioration after an initial milder phase of illness [8,9]. Radiological investigations were done to rule out orbital cellulitis when there was a suspicion of OC.

### 2.2. Statistical analysis

Statistical Package for Social Sciences (SPSS) (Inc. Chicago USA, 2001, version 15.0) was used to analyze data. The quantitative data were described as the means and standard deviation (SD) or medians with interquartile range (IQR), if data followed non-normal distribution. Mann Whitney *U* test and Chi-square tests were used to compare two groups. Contributing factors as presence of sinusitis or age were evaluated with multiple linear regression. Probabilities (*p*-values) less than 0.05 were considered significant for all tests.

## 3. Results

### 3.1. Demographic and clinical data

The study included 54 patients who were hospitalized in the pediatric infectious disease ward with the diagnosis of PC. The average age was 5 years (ranging from 2 to 11 years) and male to female ratio was 1:2. The most common symptoms were swelling (94.4%) and redness (83.3%) around eye followed by fever (31.5%). Thirty one (57.4%) of the patients were under five years of age. Predisposing factors and clinical features were reviewed in Table 1. The ratio of the patients with sinusitis (78%) was significantly higher in the group of children > 5 years compared to the children ≤ 5 years (6%); *p* < 0.001). The rate of presence of erythema, eye lid swelling and

**Table 1**  
Demographic features of children with preseptal cellulitis.

Parameters	Total n = 54 (%)	≤ 5 years n = 31 (57.4%)	> 5 years n = 23 (42.6%)	<i>p</i> <sup>a</sup>
Sex				
Male	18 (33.3)	10 (32.3)	8 (34.8)	0.846
Female	36 (66.7)	21 (67.7)	15 (65.2)	
Predisposing factors*				
Sinusitis	20 (37.0)	2 (6.5)	18 (78.3)	< 0.01
Conjunctivitis	4 (7.4)	1 (3.2)	3 (13.0)	0.173
Tooth decay	3 (5.6)	1 (3.2)	2 (8.7)	0.386
Local trauma	3 (5.6)	3 (9.7)	–	NS
Signs and symptoms*				
Erythema	45 (83.3)	26 (83.9)	19 (82.6)	0.902
Eye lid swelling	51 (94.4)	29 (93.5)	22 (95.7)	0.739
Fever	17 (31.5)	11 (35.5)	6 (26.1)	0.462

\*Values shown as median with interquartile range.

<sup>a</sup> Mann Whitney *U* test and Chi-square tests were used to compare two groups.

fever in patients were not significantly different between age groups (*p* > 0.05). The median duration of hyperemia and swelling around eye for all patients was 2.0 days (1.0–14.0 days) and the fever duration was 1.0 day (1.0–5.0 day). The median duration of hyperemia (2.0 days versus 2.0 days; *p* = 0.538), swelling (2.0 days versus 1.0 day; *p* = 0.414) and fever (1.0 day versus 2.0 days; *p* = 0.726) were not statistically different between age groups.

All patients were treated with intravenous antibiotics. The most common used antibiotics were ampicillin sulbactam and clindamycin (81.5% and 59.3% respectively). Cefotaxime and vancomycin were added to therapy when clinical impairment was observed (20.4% and 14.8% respectively). Besides nasal irrigation with isotonic saline solution was used as part of the treatment of patients with sinusitis when necessary according to our protocol.

### 3.2. Length of stay

The median length of stay (LOS) for entire group was 4.5 days (1–23 days). It was significantly longer in the patient group of over five years (median 6.0 days ranging from 3.0 to 23.0 days) than the patient group of under five years (median 4.0 days ranging from 1.0 to 12.0 days) (*p* = 0.007). The patient group with sinusitis had significantly longer LOS (median 7.0 days ranging from 3.0–23.0 days) than the group without sinusitis (median 4 days ranging from 1 to 10 days) (*p* < 0.001).

The relationship between LOS (measured by days) and total hospital costs (measured by U.S. dollar) was investigated using Spearman correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a strong, positive correlation between the two variables (*r* = 0.854, *n* = 53, *p* < .0001); high levels of hospital costs were associated with longer LOS.

### 3.3. Cost results

Total hospital cost of all patients was \$11,841; antibiotic and inpatient floor costs had the highest percentages of total cost, accounting for 37% and 36% of the costs respectively (Fig. 1).

#### 3.3.1. Comparison within age group

When accounted by age groups, antibiotic and inpatient floor costs were still the highest ones for each group, but found higher in the patient group of older than 5 years (Table 2). Total and categorical hospital costs of all patients and groups were summarized in Table 2. The median total cost in the patient group > 5 years was significantly higher than the younger patients (\$217.9 versus \$81; *p* = 0.001). In addition to the total hospital cost, the median values of inpatient floor (\$71.3 versus \$47.6, *p* = 0.004) and antibiotic cost (\$114.2 versus \$14.1; *p* < 0.001) were significantly higher in the patients > 5 years. However there was no significant difference regarding radiology, laboratory and other treatment (except antibiotic) costs (*p* > 0.05) (Table 2).

#### 3.3.2. Comparison within the presence of sinusitis

The median total cost in the patient group with sinusitis was significantly higher than the group without sinusitis (\$372.6 versus \$77.1; *p* < 0.001). In addition, the median value for inpatient floor cost (\$111.9 versus \$45.2; *p* < 0.001); for antibiotic costs (\$121.9 versus \$14.2; *p* < 0.001); for other treatment costs (\$187.0 versus \$24.1; *p* < 0.001); for laboratory costs (\$17.8 versus \$8.5; *p* = 0.006); radiology costs (\$18.3 versus \$0; *p* < 0.001) were significantly higher in the patient group with sinusitis when compared to the group without sinusitis.

A multiple linear regression was calculated to predict hospital stay duration based on age and presence of sinusitis. A significant regression equation was found ( $F(2,51) = 10.893$ , *p* < 0.001), with an  $R^2$  of

Download English Version:

<https://daneshyari.com/en/article/8806370>

Download Persian Version:

<https://daneshyari.com/article/8806370>

[Daneshyari.com](https://daneshyari.com)