



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/vhri

Children Hospitalized for Varicella: Complications and Cost Burden

Ozden Turel, MD^{1,*}, Mustafa Bakir, MD², Ismail Gonen, MD^{1,3}, Nevin Hatipoglu, MD³, Cigdem Aydogmus, MD³, Emine Hosaf, MSc⁴, Rengin Siraneci, MD³

¹Department of Pediatrics, Bezmialem Vakif University Faculty of Medicine, Istanbul, Turkey; ²Department of Pediatrics, Marmara University Faculty of Medicine, Istanbul, Turkey; ³Department of Pediatrics, Bakirkoy Maternity and Children's Educational and Treatment Hospital, Istanbul, Turkey; ⁴Department of Microbiology, Bakirkoy Maternity and Children's Educational and Treatment Hospital, Istanbul, Turkey

ABSTRACT

Objective: To evaluate the direct medical cost of hospital admissions for patients with varicella (i.e., chickenpox) to assess the cost burden of varicella from a health care perspective for ultimate use in health economics studies in Turkey. **Methods:** Records of children hospitalized with varicella at the Bakirkoy Maternity and Children's Hospital between November of 2006 and June of 2011 were reviewed. Reasons for hospitalization, types of varicella-associated complications, and direct medical cost of hospitalization were noted. Patients with underlying risk factors were excluded. Data obtained from one hospital were used to estimate the national cost of the disease. **Results:** During the 4.5-year study period, 234 patients were hospitalized with varicella. Of these cases, 48 (20%) children previously ill with underlying cancers or chronic diseases were excluded from the study. Ultimately, 186 previously healthy children (age range: 14 days to 159 months, median age: 14 months) were included. The main

reasons for hospitalization were complications related to varicella (79%), the most frequent of which was skin and soft tissue infections, followed by neurological complications and pneumonia. The median cost of hospitalization per patient was US \$283, 50% of which was attributed to medication costs. The annual cost for varicella hospitalizations in Turkey was estimated at US \$396,200. **Conclusions:** A significant number of healthy children are hospitalized for varicella and associated complications. Descriptions of these complications and their related costs provide important data for cost-effectiveness studies for decisions about the inclusion of the varicella vaccine in a childhood vaccination program.

Keywords: child, complications, cost, varicella.

Copyright © 2013, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.

Introduction

Varicella, otherwise known as chickenpox, that is, the primary manifestation of a varicella zoster virus (VZV) infection, is generally mild; indeed, severe complications are seldom reported in immunocompetent children [1]. Nevertheless, hospitalizations due to varicella do occur in otherwise healthy children, thereby producing an economic burden on the health care system [2]. Worldwide, the reported incidence of varicella-related hospitalizations involving children varies widely, that is, from 0.9 to 29.4/100,000, depending on the geographic setting and hospital admission policies [3–5]. In Turkey, the exact incidence is unknown because varicella is not on the list of tracked diseases; however, estimates indicate that the rate is 6.3/100,000 [6].

A safe and effective vaccine against varicella was developed in 1970 and has been made a recommended part of childhood vaccination programs in several countries. Countries with routine childhood varicella vaccinations have seen a positive effect on disease prevention and control [7–13]. In the United States, the annual varicella-related hospitalization rate decreased from 0.5 per 10,000 in 1993 to 0.13 per 10,000 in 2001. The incidence of varicella

has also decreased in nonvaccinated groups, including adults and infants who are too young to be vaccinated, thereby suggesting a strong herd protection effect [7–10]. A widespread varicella vaccination program, however, has not yet been introduced everywhere, especially in developing countries.

The health economics of a VZV immunization program is vital for decisions on vaccine funding and has been studied in many countries [14–17]. To facilitate the decision-making process regarding the introduction of a vaccination program, each country needs to collect data on the incidence, complications, and cost due to hospitalizations associated with the particular disease under consideration. Surveillance of varicella complications is also important to assess the potential impact of a vaccination program. In Turkey, a few studies have evaluated complication rates; however, knowledge about the cost of varicella hospitalizations is quite limited. A more detailed investigation of the cost burden of varicella from a health care perspective can be accomplished by collecting data about the number and cost of hospitalizations in a tertiary care hospital in Istanbul, which can then be extrapolated to the whole country to estimate the national burden of this disease.

Conflict of interest: The authors report no conflict of interest.

* Address correspondence to: Ozden Turel, Department of Pediatrics, Division of Pediatric Infectious Diseases, School of Medicine, Bezmialem Vakif University, Adnan Menderes Bulvarı Vatan caddesi 34093 Fatih, Istanbul, Turkey.

E-mail: barisbulent98@yahoo.com.

2212-1099/\$36.00 – see front matter Copyright © 2013, International Society for Pharmacoeconomics and Outcomes Research (ISPOR).

Published by Elsevier Inc.

<http://dx.doi.org/10.1016/j.vhri.2013.05.003>

Methods

Study Design

In this retrospective cohort study, we reviewed the records of children with varicella who were admitted to the Bakirkoy Maternity and Children's Educational and Treatment Hospital (BEH) between November of 2006 and June of 2011. In Istanbul, a majority of patients are treated at secondary and tertiary care hospitals [18]. BEH is one of the main tertiary referral centers for pediatric patients in which 40,000 patients are hospitalized and over 500,000 patients are examined annually [19]. The population of children aged younger than 15 years in Istanbul is 3,455,049, that is, one-fifth of the population under 15 in Turkey [20].

Data Collection

Enrollment in this study required a discharge diagnosis of varicella or its associated complications as defined by the *International Classification of Disease* codes. Further detailed investigations of medical records of patients hospitalized with varicella were undertaken to avoid incorrect diagnoses. Data on the demographic features of the patients, their underlying conditions, reasons for hospitalization, types of varicella-related complications, blood culture results, length of hospital stay, outcomes, and costs were collected.

Hospital expenses noted in this study included the cost of the prescribed drugs, doctor visits, nursing care, laboratory and radiological diagnostic tests, bed stay, and other related charges. The records of the patients logged hospital costs in the Turkish lira and were converted into the US dollar.

Statistical Analysis

Version 16 of the Statistical Package for Social Sciences (SPSS for Windows) was used for all statistical analyses. One-way analysis of variance was used to compare continuous data among more than two groups. Multiple comparisons were analyzed by using Tukey's honestly significant difference post hoc test, while Pearson's correlation test was used to assess the relationships among continuous variables.

Results

Of the 684 children with varicella who were examined at BEH during the study time period, 234 were hospitalized. Of these cases, 48 patients (i.e., 20%) had an underlying illness and were thus excluded from the study (Table 1). Therefore, 186 previously healthy children (i.e., 55.9% males) were included in this study. Considering that BEH provides services to 15% of all children hospitalized in Istanbul and 3% of all children hospitalized in Turkey, the annual number of formerly healthy children younger than 15 years who are hospitalized because of varicella in Turkey was estimated at 1400.

The median age of the patients with varicella in our study was 14 months (i.e., ranging from 14 days to 159 months). The highest rate of hospitalization occurred in patients younger than age 3 years (i.e., 74.15%), of which 64.2% were younger than or equal to age 1 year. The median length of hospital stay for this population was 5 days. The majority of the cases were detected in the spring and early summer months, with a peak in May (Fig. 1). The main reasons for hospitalization were complications associated with varicella (i.e., accounted for 79% of the admissions). Bacterial superinfections involving the skin and soft tissues accounted for 32.6% of the admissions and were the most frequently observed complications; this was followed by neurological complications in 29.9% of the admissions and pneumonia in 21.7% of the

Table 1 – Varicella-related hospitalized patients with underlying illnesses.

Underlying illness	n	%
Malignancy		
Acute lymphoblastic leukemia	14	29
Lymphoma	2	4.2
Rhabdomyosarcoma	1	2.1
Spinal tumor	1	2.1
Neuroblastoma	1	2.1
PNET	1	2.1
Metabolic		
Type 1 diabetes mellitus	5	10.4
Congenital adrenal hyperplasia	2	4.2
Cystic fibrosis	1	2.1
Graves' disease	1	2.1
Niemann Pick	1	2.1
Hematologic		
Hereditary spherocytosis	2	4.2
Diamond Blackfan anemia	1	2.1
Thalassemia major	1	2.1
Thrombasthenia	1	2.1
Factor 7 deficiency	1	2.1
Chronic ITP	2	4.2
Primary immunodeficiency		
SCID	1	2.1
IgA deficiency	1	2.1
CVID	1	2.1
Cyclic neutropenia	1	2.1
Other	2	4.2
Other		
Holoprosencephaly	1	2.1
CMV hepatitis, hyperphenylalaninemia	1	2.1
Echinococcal cyst	1	2.1
Total	48	100

CMV, cytomegalovirus; CVID, common variable immunodeficiency; IgA, immunoglobulin A; ITP, idiopathic thrombocytopenic purpura; PNET, primitive neuroectodermal tumor; SCID, severe combined immunodeficiency.

admissions (Table 2). The children who were hospitalized for pneumonia were younger than those hospitalized with neurological complications ($P < 0.05$) (Fig. 2). Most outcomes were favorable with exception to one child needing thoracic tube insertion to treat empyema, one with abducent nerve paralysis, and one with cellulitis that resulted in severe scarring.

The median cost of hospitalization per patient was US \$283, 50% of which was attributed to medication costs (Table 3). The costs for physician visits were lowest among the cost categories listed in Table 3 because revisits are not billed in accordance with current Turkish regulations. A positive correlation was observed between the total costs and the age of the patients ($r = 0.27$, $P < 0.001$). Costs for hematological complications were higher than the costs for any of the other complications. For the five patients with the highest total costs, three had hematological complications and received blood transfusions; for the remaining two, one had septicemia and the other child had severe cellulitis that necessitated 26 days of hospitalization. The direct annual cost for otherwise healthy children hospitalized with varicella in Turkey was estimated to be US \$396,200.

Discussion

Although varicella complications are believed to be rare in immunologically healthy children, related hospitalizations have

Download English Version:

<https://daneshyari.com/en/article/990931>

Download Persian Version:

<https://daneshyari.com/article/990931>

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