International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

The Study of Epidemiological Situation of Varicella and Its Complications in Albanian Children

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Abstract: ***Varicella zoster is a common infection disease. The predominance of uncomplicated cases in children tends to overshadow the morbidity associated with severe cases and the resultant hospitalization and death. The serious problems of varicella are reduced after introduction of the vaccine against the varicella. The aim of this study was to show the epidemiological data,risk factors, complications and the tendency of this disease.In study are included all children with varicella aged 0 to 14 years old presented in our hospital during the period January 2012- december2015. Epidemiological data analyzed were sex, age, origin, risk factors and complications.During this period 1165 children were presented with signs of varicella. Among them 992(85.1%) were uncomplicated cases, 173(14.8%) were complicated. Age group most affected was 1-5 years old with 734cases(63%) followed by age of 6-14 with 344 cases(29.5%)and age group 0-1 with 87 cases(7.4%).685cases or 58.7% were male. Most of the cases877 (74.7%) came from urban zone. Some of the complications we found were: skin and soft tissue infections, cerebellitis, pneumonia etc. (tab.1).We observed risk factor such as leukemia, atopic dermatitis etc. Varicella often is followed by serious complications.The result of this study can contribute to evaluate the options for varicella vaccination.***

Keywords: varicella, complications, varicella vaccine

1. Introduction

Acute varicella is generally mild and self-limited, but it may be associated with complications. The disease can be associated with a variety of serious and potentially fatal complications in both immunocompromised and immunocompetent patients, children and adults [1], [2].

Persons older than 15years, immunocompromised children, infant less than 1 year, newborns of women with rash onset within 5 days before to 2 days after delivery,are at higher risk for developing severe disease and more complications. The most common complications are: bacterial skin lesions, nervous system manifestations, pneumonia (bacterial or viral), and Rey syndrome.Secondary infection with invasive group A Streptococci or Staphylococci group may cause serious illness and lead to hospitalization or death. The onset of maternalvaricella from 5 days before to 2 days after delivery may result in overwhelming infection of the neonate and a fatality rate as high as 30%. Rare complications of varicella include aseptic meningitis, transversemyelitis, Guillain-Barré syndrome, thrombocytopenia, hemorrhagic varicella, purpura fulminans, glomerulonephritis, myocarditis, arthritis, orchitis, uveitis, iritis, and hepatitis. The incidence of varicella, as well as varicella-related complication hospitalizations, has decreased significantly since licensure of vaccine in 1995.The number of cases and the severity too,has declined 97% in all group of ages[3],[4],[5].

2. Materials and Method

This study was conducted at the University Hospital Center "Mother Teresa" which is a tertiary care center, the biggest hospital of Albania. Surveillance of chickenpox cases was startedin January 2012 and continued until December 2015.In the study we have included all children will sign and symptoms of varicella, presented in emergency room. Data collected are age, sex, origin, the monthly spreading, date of clinic or hospital visits, underlying diseases, hospitalization. We followed all complicated cases after being admitted to the hospital and collected all the data.

3. Results

During the period of study 1165 cases with varicella there have been found.Of these 992 or 85.1% were uncomplicated cases,173 or 14.8%were complicated cases(Fig.1).There was a slight male predominance with 685(58.7%) cases and 480(41.2%)were females. Most of cases came from urban zones with 871 cases or 74.7% and 294 or 25.2% came from rural zones Most cases occurred during the year 2013 which has the majority of complicated cases too Fig. 2, Fig. 3.

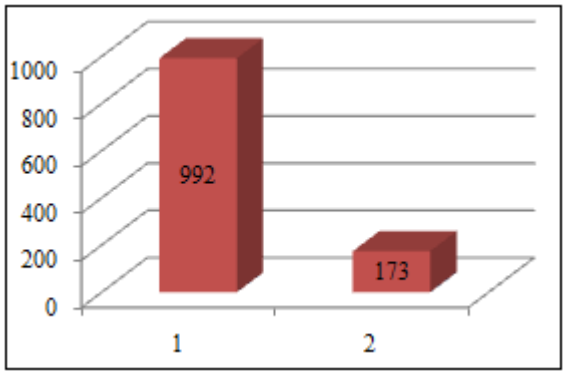

Figure 1: The difference between uncomplicated and complicated cases

The majority of chickenpox cases occurred in young children aged 1-4 years with 734(60%) cases followed by school-aged children 5-14 years .87 cases or 7.4% occurred in infant less than one year of age.Fig. 4.

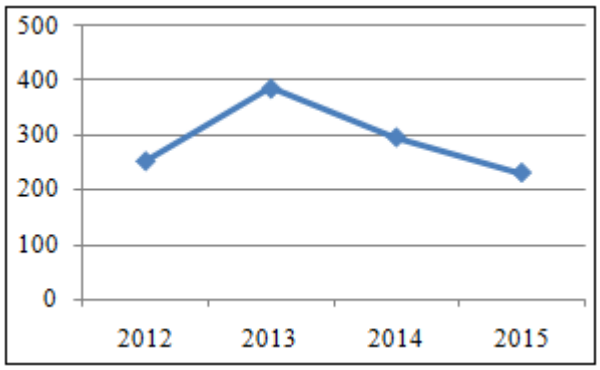

Figure 2: The spreading of varicella, during the period of study.

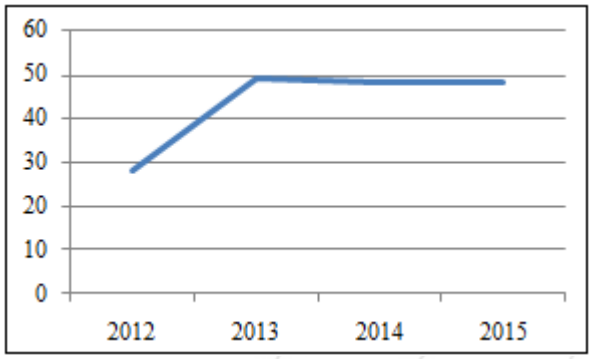

Figure 3: The spreading of complicated cases over the years in study.

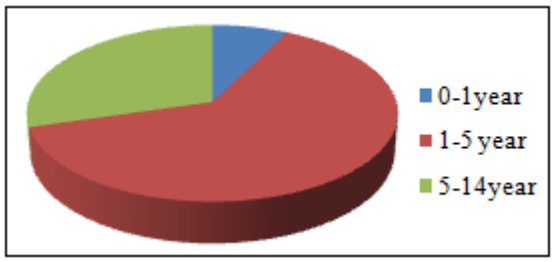

Figure 4: The spreading of children with varicella considering there group of ages.

Some of the complicated cases have been treated as outpatient 42(24.2%) cases and 131(75.2%) cases required hospitalization.

Although chickenpox occurred throughout the year, there were seasonal peaks during the months April-July 2012, November 2012-July2013, December2013-July2014, January-July. Fig. 5.

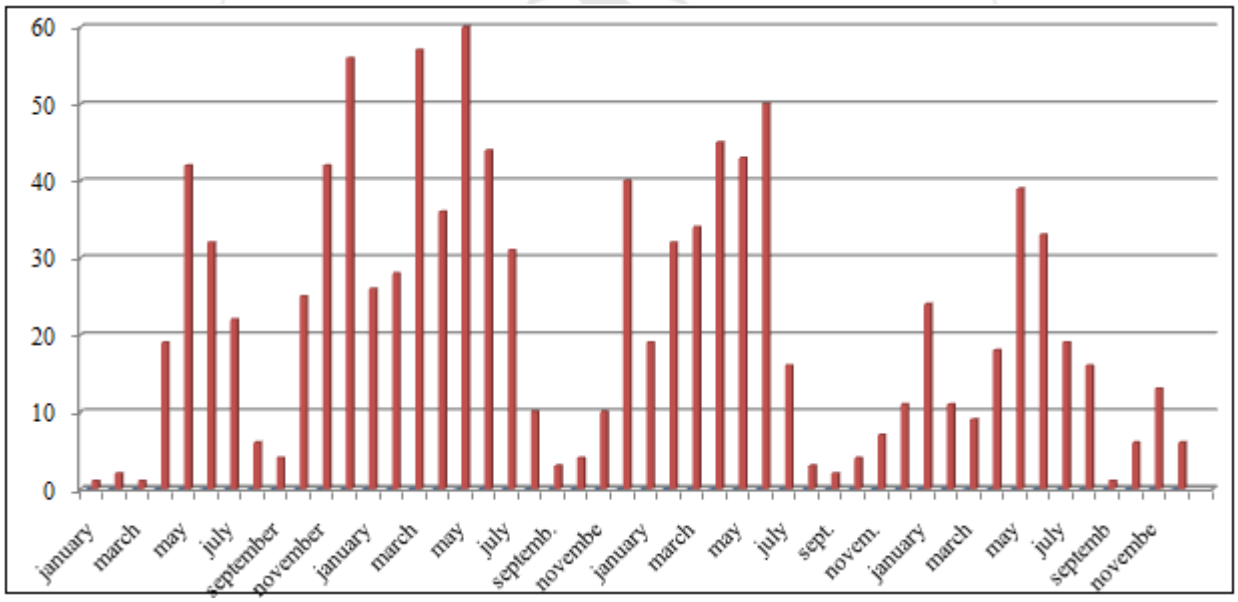

Figure 5: The incidence of chickenpox among the Albanian children, in each month, during the period of study.

In the table below are listed all kind of complications noted during the period of study.

Table 1: The outcomes for 1165 children with varicella during the period 1January 2012-december2015

Variable	Nr	%
Total number of complications	173	14.8
Pneumonia	42	24.2
Skin and soft tissue Infections	33	19
Gastro -enteric signs	31	17.9
Bacteremia	7	4
Seizures	7	4
Acute Leukemia	6	3.4
Urine tract infections	7	4
Stomatoglossitis	5	2.8
Viral infection	4	2.3
Tonsillitis	3	1.7
Encephalitis/cerebellit	2	1.1
Hemorrhagictype	1	0.5
Morbus Hocking	2	1.1
Thrombocytopenia	1	0.5
Ocular involvement	1	0.5
Urticaria	2	1.1
Leishmaniosis	1	0.5

4. Discussion

The aim of this study is surveillance of all varicella cases in particular those complicated, among Albanian children presented in our hospital during the period January 2012-december 2015.By looking at all the varicella cases, we can create one complete and accurate picture of major complications. These results indicate that the complication and hospitalization rate (130/1000) cases during the period of study is similar with those reported from other European countries among the population where the vaccine against varicella is not yet introduced [7],[8],[9]. Hospitalizations incidence in Europe ranged from 1.3 to 4.5/100000 varicella cases and was higher in children younger than 16 years old (12.9–28/100000).The average duration of hospitalization ranges between 3 and 8 days. [10], [11]. Most complications and hospitalizations for varicella occurred in children who were immunologically healthy with no underlying medical conditions. So in Italy Marchetto et al. 2007 in a study period 2002-2006, reported a hospitalization rate 349 children of age up to18 year and one case of death .In Switzerland Bonheoffer *et al*., 2005 reported 335 varicella cases 0-16 year of age, with 3 deaths, in the period 2000-2003. In Germany Liese *et al*.,2008 reported 918 children with varicella 0-17 year of age, during the period 2003-2004. Occasionally, complications of varicella can be fatal; [12],[13]. Of 13varicella-related deaths reporting in children aged 9 months to 9 years, during the 2006 to 2007 varicella season in England, Scotland and Wales, 12 occurred in immunologically healthy children. [14]. Eight children died following catastrophic deterioration over less than 24 hours; group A streptococcal sepsis was confirmed in five children and *Staphylococcus aureus* sepsis in two children. [14]. Other potentially fatal complications of varicella in children include pneumonia and myocarditis [15]. In a epidemiological study in United States, prior to the initiation of varicella vaccination Choo et al.reported an overall hospitalization rate of 61/10000 cases [16].In Canada, Rives et al. reported a complication rate in the province of Quebec to be 92.2/10000 cases [17]. Varicella is a serious infection in pregnancy, estimated to affect about 2,000 pregnancies each year in the UK. [18]. If left untreated, pregnant women are at greater risk of varicella pneumonia, occurring in about 9% of pregnant women with varicella [19]. Varicella may also cause complications in the infant caused by intrauterine infection with VZV *via* placental transmission at any stage of pregnancy. Intrauterine infection of the fetus in the early stages of development may result in congenital varicella syndrome. [20].The serious consequences of varicella during pregnancy and the increased risk of herpes zoster for the child can be minimized by appropriate diagnosis and by using currently available immunoprophylactic interventions. [21].The complication rate, in different study reports varies depending on the way the data were collected. In our study, we have involved only the children by 1month to 14-year age presented in our hospital. The risk of death and severe complication from varicella is much higher (25 to 174-fold) in adults than in children.[22]. As in children, the majority of adult deaths from varicella occur in previously healthy individuals, although underlying medical conditions, often immune-suppression, contribute to a fatal outcome in some cases [23]. In our study, we found the pneumonia to have the most complication rate with 24.2% of all complicated cases, followed by skin and soft tissue infections with 19%. In this study, we do not have mentioned the rate of the causative agent because we have encountered difficulties on laboratory investigation of complications cases. In this period of study we did not have any death case from varicella but this does not mean that will do not have the future.

5. Conclusions

Surveillance from countries that have implemented varicella vaccination in children have shown a rapid decrease of varicella cases, complications, hospitalization rates and deaths in all age groups.[3]. Despite European recommendations for varicella vaccination, VZV continues to cause a high number of varicella cases, potentially requiring medical visits or hospitalizations and occasionally leading to long-term sequels or even death. The majority of varicella complications occur in healthy children, meaning that it is not possible to predict who will be affected. Accumulating evidence from countries that have implemented universal varicella vaccination of infants demonstrates a dramatic reduction in the burden of varicella, thus providing the strongest support for widespread implementation of the WHO recommendation for varicella vaccination in my country.

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[12] 12916_2009_204_MOESM1_ESM.doc Additional file 1: Tables S1–S3. Table S1 – Summary of varicella-related mortality data from European countries. Table S2 – Seroprevalence of varicella among children in Europe. Table S3 – Recommendations for varicella and measles-mumps-rubella (MMR) vaccination in European countries. (DOC 136 KB)
[13] 12916_2009_204_MOESM2_ESM.doc Additional file 2: Supplementary appendix. Summary of varicella epidemiology in European countries. (DOC 132 KB)
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