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ORIGINAL ARTICLE

Characteristics of chickenpox in children and adults at a tertiary health center in Sarajevo, Bosnia-Herzegovina

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ABSTRACT

Introduction: Chickenpox is very contagious childhood disease, which occurs due to varicella-zoster virus (VZV) primary infection. Disease in healthy children resolves usually without complications, but risk of complication is much higher in adults and immunocompromised hosts. The goal of this study was to determine different clinical and epidemiological characteristics, laboratory features, clinical course, and outcome of chickenpox in children and adults.

Material and methods: The descriptive study was conducted at the Department of Infectious Diseases, Clinical Center in Sarajevo, Bosnia-Herzegovina. The study included 120 patients chosen randomly. We compared their clinical and epidemiological characteristics, laboratory investigations, complications and the outcome of the disease.

Results: Age of patients was in range from one to 48 years. Male patients prevailed in both groups (65% in adults, 52% in children). Hospitalization rate was 10.7/100,000 inhabitants. Positive contact with chickenpox was confirmed in 80% adults and 82% children. Dominating symptoms were fever, rash and muscle aches. Levels of C-reactive protein, erythrocyte sedimentation rates (ESR) and fibrinogen levels were elevated in both groups, while thrombocytopenia was presented in 33% of adults and 3% of children. Adults had complications in 83.3% and their hospitalization rate was longer compared to children (11.5 days vs. 9.5 days, $p<0.001$).

Conclusions: Chickenpox is a potentially severe illness in adult patients. Introduction of active immunization in Bosnia-Herzegovina should be considered to prevent severe forms of chickenpox. *J Microbiol Infect Dis 2012; 2(2): 64-67*

Key words: Chickenpox, complications, pneumonia

Bosna-Hersek, Saraybosna'da üçüncü basamak bir sağlık merkezinde suçiçeğinin çocuklar ve erişkinlerde klinik özellikleri

ÖZET

Amaç: Suçiçeği varicella-zoster virusunun (VZV) primer enfeksiyonu olarak görülen çok bulaşkan bir çocukluk hastalığıdır. Sağlıklı çocuklar genellikle sekel kalmadan düzelmektedirler ancak komplikasyon riski erişkinlerde ve immün yetmezlikli konaklarda çok daha yüksektir. Bu çalışmanın amacı suçiçeğinin çocuklarda ve erişkinlerde çeşitli klinik ve epidemiyolojik karakteristiklerini, laboratuvar özelliklerini, klinik seyir ve akıbetini araştırmaktır.

Gereç ve yöntem: Bosna-Hersek'in başkenti Saraybosna'da bulunan Merkez Klinik'te bulunan Enfeksiyon Hastalıkları Departmanında tanımlayıcı bir çalışma yapıldı. Çalışmaya rastgele seçilen 120 hasta dahil edildi. Klinik ve epidemiyolojik karakteristikleri, laboratuvar sonuçları, komplikasyonları ve hastalığın akıbeti karşılaştırıldı.

Bulgular: hastaların yaşları 1 ile 48 arasındaydı. Her iki grupta da erkek hastalar baskındı (erişkinlerde %65, çocuklarda %52). Hastaneye yatırma oranı nüfusun 100.000'de 10,7'si idi. Suçiçeği ile temas, erişkinlerde %80, çocuklarda %82 oranında teyit edildi. Baskın olan semptomlar ateş, döküntü ve kas ağrısı idi. C-reaktif protein düzeyi, sedimantasyon hızı ve fibrinojen düzeyleri her iki grupta yükselirken trombositopeni sıklığı erişkinlerde %33, çocuklarda ise %3 kadardı. Erişkinlerin %83,3'ünde komplikasyon vardı ve hastaneye yatırılma oranları çocuklardan daha uzundu (11,5 güne karşılık 9,5 gün, $p<0,001$).

Sonuç: Suçiçeği erişkinlerde potansiyel olarak ciddi bir hastalıktır. Bosna Hersek'te suçiçeğinin ciddi formlarından korunma aktif aşılamanın uygulamaya konması değerlendirilmelidir.

Anahtar kelimeler: Suçiçeği, komplikasyonlar, pnömoni

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INTRODUCTION

Chickenpox is childhood disease, which occurs because of varicella-zoster virus (VZV) primary infection. It is still considered as "children's disease", but recently an increased number of infected adults are being reported.[1] It is highly contagious among people who are not immune and virus is spread easily through coughing or sneezing of ill individuals or through direct contact with secretions from the rash. Symptoms include fever, headache, dry cough, and characteristic itching rash that goes through three phases: papules, vesicles, and crusts. Illness in children runs mostly without complications, with mild to moderate symptoms. Complications of chickenpox in children are rarely described (up to 2%).[2-4] However in adults a lot of complications may occur, such as pneumonia (10-50%)[5], bacterial super infections of skin (2-21%),[6] ocular and neurological manifestations (0.03%).[7] Therapy of complications in most cases requires combinations of antiviral drugs and antibiotics for long period of time. Fatal outcome is rare. In the United States, mortality rate dropped from 0.41 per one million populations to 0.14 after introduction of varicella vaccine. Active immunization in some countries also significantly reduced hospitalization and complications due to chikenpox.[8,9] In the last few years we have noticed an increased number of present complications and longer hospitalization in adults at our clinic. For this reason, we decided to compare these and other parameters in hospitalized children and adults to see possible differences.

MATERIALS AND METHODS

The descriptive study was conducted at Clinic for Infectious Diseases Clinical Center of Sarajevo, Bosnia-Herzegovina. This clinic has 80 hospital beds, with 17 infectious disease experts employed. All patients with chickenpox, children and adults, are hospitalized in this clinic. Study included 120 patients with confirmed varicella-zoster infection who have been hospitalized during the period of 1st January 2005 to 30th June 2011. In a retrospective approach, 60 of these patients were chosen randomly from the period between 1st January 2005 and 30th June 2010. Randomization was based on table of random numbers. The other 60 patients were followed prospectively, for a period 1st July 2010 to 30th June 2011. Patients were distributed into two groups according to age: children (<18 years) and adults (>18 years). We compared the demographic and epidemiological characteristics, laboratory investigations, clinical symptoms (fever, headache, rash, muscle ache, respiratory symptoms, vomiting), complications and the outcome of the disease. Cut-off values for laboratory investigations were: C-reactive protein <5mg/L, platelets 150-400 x 10^9/L, leukocytes 4-10x10^9/L, ESR 0-20 mm/1h, aminotransferases: AST 10-40 IU/L, ALT 10-48 IU/L. Diagnosis of pneumonia origin (viral or bacterial) was based on chest X-ray characteristics, and values of inflammatory markers such as C reactive protein (CRP), eritrocyte sedimentation rate (ESR) and leukocytes. Criteria for inclusion were clinical confirmation of varicella infection and for prospectively monitored patients serological confirmation of disease, such as ELISA, was needed. According to the symptoms and complications, patients were classified into three subgroups: mild, moderate and severe clinical features. Patients who had residual chickenpox symptoms which do not disrupt the daily activities were considered as "recovered", while "healed" patients were considered patients with no symptoms at discharge. For serological confirmation, we used ELISA Enzygnost Anti VZV IgM/IgG kit (Dade Behring, Marburg, Germany). Serological testing was conducted at Institute for Microbiology, Clinical Center University of Sarajevo. Statistical analysis was performed using software for statistical analysis (SPSS ver 15.0 program for Windows and Microsoft Excel 2003).

RESULTS

During the six and half year period a total of 11,197 patients were admitted to the Clinic for Infectious Diseases, Clinical Center University of Sarajevo, Bosnia-Herzegovina. Among them 333 (2.9%) patients had a chickenpox [197 adults (59%), 136 children (41%]. The average rate of hospitalization for this period was 10.7/100,000 inhabitants per year, according to total population in Sarajevo for years 2007 to 2011. The age range was 1 to 48 years. For adults it was 19 to 48 years, with a mean of 33 years, and for the children it was 1 to 18 years, with a mean of eight years.

Anamnestic data taken from the patients showed positive contact with chickenpox in similar percent for both groups. None of these pa-

tients received chickenpox vaccine. Duration of symptoms before hospitalization was 4.3 days for adults and 3.3 days for children.

Thrombocytopenia was found in 20 (33.3%) adults and 6 (10%) children. We had elevated levels of CRP in 43 (71.6%) adults and 35 (58.3%) children. Level of erythrocyte sedimentation rate (ESR) was elevated in 27 (45%) adults and 23 (38.3%) children. Levels of leukocytes, eryhrocytes, hemoglobins, urea, creatinine, alanine aminotransferases (ALT) and aspartate aminotransferases (AST) were in normal ranges. Varicella serological tests were positive for all tested patients among groups. Nasal swabs were positive for Staphylococci in six of children (10%) and seven of adults (11.6%). Streptococci was found positive in two children' swabs (3%). Other swabs were negative.

Table 1. Percentage of patients with symptoms of chickenpox on admission to hospital in both groups

Symptoms	Fever n (%)	Headache n (%)	Rash, n (%)	Muscle ache n (%)	Respiratory symptoms n (%)	Vomiting n (%)
Adults (n=60)	56 (93.3)	31 (51.6)	58 (96.6)	49 (81.6)	23 (38.3)	7 (11.6)
Children (n=60)	56 (93.3)	29 (48.3)	52 (86.6)	41 (68.3)	26 (43.3)	7 (11.6)

In adult group, 50 (83.3%) patients with severe and 10 (16.7%) with moderate clinical features, while in child group, 40 (66.7%) patients with severe, and 20 (33.3%) with moderate clinical features. Skin super infection as complication was presented more in adult cases than in children (78.3% vs. 60%) with statistically significance ($p<0.005$).

Pneumonia was seen in 21 (35%) of adults and 19 (31.6%) of children. According to radiological and laboratory findings, 18 adults and 15 children pneumonia was of bacterial origin, and in rest of the cases was of viral origin. In adult group 11 (18.3%) patients were considered healed compared to 14 (23.3%) patients in children group. Recovered were considered 49 (81.7%) of adults and 46 (76.7%) of children. Children are more likely dismissed from the hospital as healed compared to adults, who are often dismissed as recovered. The mean length of hospitalization in adults was 11.5 days (range 3-31 days), and in children 9.5 days (range 2-19 days) with statistical significance ($p<0.001$). We found no death in both the groups.

DISCUSSION

Chickenpox is disease with very high contagious index, occurs worldwide and endemic i most countries. Disease in childhood lasts without complications. We had a hospitalization rate similar to most European countries, where it is 1.3-9.9/100,000 inhabitants per year.[10] Disease have no sex predisposition, but in our study males dominated in group of adults. Previous studies have shown that the ratio of men vs. women was in the range of 1:1 to 1.2:1.[11,12] School-age patients dominated in a group of children, while in a group of adults median age was 33 years. Very high percent of patients from both groups reported previous contact with sick person, which is more than described so far.[13]

Mean time from the onset of first symptoms till admittance to hospital was higher in group of adults, which coincides with previous studies.[14] Characteristic symptoms and signs of disease include rash, fever, myalgia, headache, respiratory problems and vomiting similar to our study.[15,16]

Haematological changes during chickenpox, especially thrombocytopenia, are common. We found 33% adults and 3% of children with sings of thrombocytopenia. This result is similar to other relevant studies.[17,18] Elevation of CRP usually follow bacterial super infection during chickenpox.[19,20] Complications during varicella can be a primary, secondary or immunological. In hospitalized patients complications occur in 47-76%.[21,22] Pneumonia is the most frequently reported complication.[23,24] It is more common in adults than in children. Our results show that in the adult group 35% had pneumonia, while in children 31.6%. The rate of complication is reported to be in 1-27% of cases.[18,22,25] Recent studies show that secondary bacterial skin super infection is present in 14-50% of patients.[18,26,27] We encountered a higher rate. Possible etiological cause were staphylococci and streptococci, who are found positive

in a nasal swabs. They are considered as most commonly implicated bacterial pathogens.[28]

Severity of the clinical features depends on the immune status of the patient and the existence of complications. In our study, 83.3% of adults and 67.7% of children had severe clinical features, which is much higher compared to literature data.[29] Mean length of hospitalization of our patients coincides in other relevant studies. In a group of adult patients higher number were considered cured, compared to group of children. Recovery was considered in higher percent of adults than in children. Fatal outcome is rare, and it happens in a range from 0.05-0.4 per million.[30,31] Adult patients have a risk of lethal outcome more than 20 times higher than children.[10]

In conclusion, chickenpox can occur in adults and children with higher risk of complications. Preventive strategies including the introduction of varicella vaccine in Bosnia-Herzegovina, may reduce incidence of chickenpox or its complications, especially in adults and immunocompromised patients.

REFERENCES

1. Mohsen AH, McKendrick M.Varicella pneumonia in adults. Eur Respir J 2003; 21:886-891.
2. Ulrich H, Jane FS. Varicella. Lancet 2006; 368:1365-1376.
3. Meyer PA, Seward JF, Jumaan AO, Wharton M. Varicella mortality: trends before vaccine licensure in the United States, 1970-1994. J Infect Dis 2000; 182: 383-390.
4. Deguen S, Chau NP, Flahault A. Epidemiology of chickenpox in France (1991-1995). J Epidemiol Community Health 1998; 52:46-49.
5. Chiner E, Ballester I, Betlloch I, et al. Varicella-zoster virus pneumonia in an adult population:Has mortality decreased? Scand J Infect Dis 2010; 42: 215-221.
6. Galil K, Brown C, Lin F, Seward J. Hospitalizations for varicella in the United States, 1988 to 1999. Pediatr Infect Dis J 2002; 21: 931-935.
7. Girija AS, Rafeeque M, Abdurehman KP. Neurological complications of chickenpox. Ann Indian Acad Neurol 2007; 10:240-6
8. Huong Q, Nguyen MPH, Aisha O, et al. Decline in mortality due to Varicella after implementation of Varicella vaccination in the United States. N Engl J Med 2005; 352:450-458.
9. Davis MM, Patel MS, Gebremariam A. Decline in varicella-related hospitalizations and expenditures for children and adults after introduction of varicella vaccine in the United States. Pediatrics 2004;114:786-792.
10. Bonanni P, Breuer J, Gershon A, et al. Varicella vaccination in Europe - taking the practical approach. BMC Med 2009; 28:26.
11. Paul E, Thiel T. Epidemiology of varicella zoster infection. Results of a prospective study in the Ansbach area. Hautarzt 1996; 47:604-609.
12. Gila A, San-Martin M, Carrascoa, Gonzalez A. Epidemiology of severe varicella-zoster virus infection in Spain. Vaccine 2004; 22:3947-3951.
13. Alanezi M. Varicella pneumonia in adults: 13 years' experience with review of literature. Ann Thoracic Med 2007;2:163-165.
14. Arvin AM, Gershon A. Varicella-Zoster Virus: Virology and Clinical Management. Cambridge University Press. 2000.
15. Myers MG, Seward JF, LaRussa PS. Varicella-zoster virus. In: Kliegman RM, Behrman RE, Jenson HB, Stanton BF. Nelson Textbook of Pediatrics. 18th ed. Philadelphia. Saunders Elsevier, 2007: chap 250.
16. Whitley RJ. Varicella zoster virus. In: Mandell GC, Bennett JE, Dolin R. Principles and practice of infectious diseases. 5th edn. Philadelphia, Churchill Livingstone, 2000:1580-5.
17. Ali N, Anwar M, Majeed I, Tariq WU. Chickenpox associated thrombocytopenia in adults. J Coll Physicians Surg Pak 2006; 16: 270-272.
18. Dulovic O, Gvozdenovic E, Nikolic J, Spurnic AR, Katanic N, Kovarevic-Pavicevic D. Varicella complications: is it time to consider a routine varicella vaccination? Vojnosanit Pregl 2010; 67:523-529.
19. Molligoda P, Suriyarachchi C. Necrotizing fasciitis following chicken pox in a child with dermatomyositis. Sri Lanka J Child Health 2009; 38: 40-42
20. Mason LW,Carpenter EC, Morris E, Davies J. Varicella Zoster Associated Osteomyelitis. Internet J Orthop Surg 2009;11: 23
21. Liese JG, Grote V, Rosenfeld E, Fisher R, Belohradsky BH, Kries R. ESPED Varicella Study Group. The burden of varicella complications before the introduction of routine varicella vaccination in Germany. Pediatr Infect Dis J 2008; 27:119-124.
22. Dass R, Singh S, Kumar V, et al. Varicella glomerulonephritis mimiking microscopic polyangitis. Rheumatol Int 2004; 24: 362-364.
23. Hockberger RS, Rothstein RJ. Varicella pneumonia in adults spectrum of disease. Ann Emerg Med 1986;15:931-934.
24. Almuneef M, Memish Z, Blakhy HH, Alotaibi B, Helmy M. Chickenpox complications in Saudi Arabia: is it time for routine vaccination? Int J Infect Dis 2006; 10: 156-61.
25. Cameron JC, Allan G, Johnston F, Finn A, Heath PT, Booy R. Severe complications of chickenpox in hospitalised children in the UK and Ireland. Arch Dis Child 2007; 92: 1062-1066.
26. Koturoglu G, Kurugöl Z, Cetin N, Hizarcioglu M, Vardar F, Helvaci M, Capar Z, Ozkinay F, Ozkinay C. Complications of varicella in healthy children in Izmir, Turkey. Pediatr Int 2005; 47:296-269.
27. Piqueras AI, Otero RMC, Perez-Tamarit D, Asensi BF, Diosdado ON, Santos DM. Hospitalizations for varicella in the Hospital Infantil La Fe, Valencia, Spain, 2001-2004. An Pediatr 2005;63(2):120-124.
28. Abro AJ, Ustadi AM, Das K, Saleh Abdou AM. Chickenpox: presentation and complications in adults. J Pak Med Assoc 2009: 59: 828-831.
29. Ejaz A, Raza N, Sohail M. Outcome of chicken pox in adult immunocompetent patients. J Pakistan Assoc Dermatologists 2006; 16:141-146.
30. Varicella-related deaths in Florida, 1998. MMWR Morb Mortal Wkly Rep 1999; 48:379-381.
31. Marin M, Zhang JX, Seward JF. Near elimination of varicella deaths in the US after implementation of the vaccination program. Pediatrics 2011; 128:214-220.