

## Original Article

# Hematological abnormalities in adult patients of chicken pox

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**Abstract** *Background* Chicken pox (Varicella) is a highly communicable viral disease that occurs most often in children but it can occur at any age and can prove more fatal in adults, due to its complications like pneumonia, thrombocytopenia and neurological abnormalities.

*Objective* The study was aimed to see hematological abnormalities in chicken pox patients.

*Patients and methods* Sixty patients of both sexes, aged between 15-50 years were included in the study. Blood complete picture (CP) including platelet count was done in all cases on first presentation of the disease. A second blood CP was performed after two weeks duration. Blood hemoglobin (Hb), total leukocytes count (TLC) and platelets count (PC) were recorded and then compared with age and sex matched healthy individuals.

*Results* Patients with chicken pox were found to have normal Hb and TLC but relatively lower platelet count as base line finding. A slight change was seen after two weeks in Hb and TLC while a significant improvement was observed in platelets ( $p < .05$ ). When compared with healthy individuals, it was only the platelet counts that were significantly different ( $p < .001$ ).

*Conclusion* Anemia is not a feature of chicken pox but a relative leucopenia can be expected as in any other viral infection. It is thrombocytopenia that is found more significantly in chicken pox, probably caused by production of antiplatelet autoantibodies in these patients. Platelet specific autoantibodies are probably the cause of thrombocytopenia in patients of chicken pox and we should have a closer look on platelet count in such patients.

### Key words

Chicken pox, varicella, varicella-zoster virus, thrombocytopenia

## Introduction

Chickenpox (varicella) is an acute, contagious disease, characterized by a generalized exanthem consisting of vesicles that occur in successive crops and that rapidly evolve into pustules, crusts, and scabs. Chicken pox is a manifestation

of primary infection with the varicella-zoster virus. After the acute infection subsides, the virus like other herpesviruses, persists in a latent form. Humans are the only source of infection for this highly contagious virus. Person-to-person transmission occurs primarily by direct contact with patients with varicella or zoster, occasionally by airborne spread from respiratory secretions and rarely from zoster lesions. *In utero* infection can also occur. Introduction of a varicella-zoster virus infection into a household usually results in infection of nearly all susceptible

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persons. Nosocomial transmission is well-documented in pediatric units, but transmission is extremely rare in newborn nurseries. Immunity is generally life long. Symptomatic reinfection is rare in healthy persons, although asymptomatic reinfection does occur.<sup>1-4</sup> About 90% of reported cases of chickenpox occur in children younger than 14 years of age, but varicella in adolescents and young adults may be becoming more common.<sup>5</sup> Varicella is most common during the late winter and early spring.<sup>6</sup> Asymptomatic primary infection is unusual. Immunocompromised individuals with either primary (varicella) or recurrent (zoster) infection are at increased risk of severe disease. Since the incubation period for varicella is 10 to 21 days, those cases beginning in the first 10 days of life are considered to have been acquired in utero. Chickenpox is heralded by the approximately simultaneous occurrence of fever and rash. The rash is characteristically centripetal, beginning on the face or scalp and spreading rapidly to the trunk, but with relative sparing of extremities. It begins as red macules but progress quickly to vesicles and crust. Itching is the rule. There is a tendency for new lesions to occur in crops.<sup>1-4,7</sup> Most childhood infections are benign; however, the disease may have serious sequelae in adults. Pneumonia can complicate up to 20% of cases, with mortality rates reaching 40%. Other complications include encephalitis, myocarditis, pericarditis, adrenal insufficiency, glomerulonephritis, hepatic dysfunction, and thrombocytopenic purpura.<sup>1,5,8-13</sup> Varicella is usually a clinical diagnosis. Laboratory tests are available for confirmation, but they are not always

required. The white blood cell (WBC) count may be normal, low, or mildly elevated. Marked leukocytosis suggests a secondary infection. Culture of the base of the vesicle, direct electron microscopy, and immunofluorescence staining of the base of the lesion may be performed for detection of V-Z virus but usually are not necessary.<sup>1,3,14,15</sup> Although a positive history of chickenpox is a good indicator of immunity, a negative history of clinical disease is unreliable. Treatment of varicella is generally supportive. Warm soaks and oatmeal or cornstarch baths may reduce itching and provide comfort. Topical calamine lotion may produce soothing and drying of the skin lesions. Systemic antiviral (acyclovir) is recommended only in immunocompromised individuals or in patients with varicella complications.<sup>1,8,16</sup> For susceptible individuals, passive immunization with VZIG is effective against varicella if given within 96 hours of exposure.<sup>17</sup> The prognosis of uncomplicated varicella is excellent. The mortality rate of adult varicella pneumonia is quite high in immunocompetent as well as in immunocompromised patients.<sup>8,11</sup>

### **Patients and methods**

A total of sixty patients of both sexes, aged between 15-50 years were included in the study. Majority of patients were the serving persons of the armed forces and their families. After taking thorough history of illness, duration and nature of the rash, blood complete picture (CP) including platelet count was done in all cases on first presentation. Most of the patients were admitted in the hospital and

were treated as indoor patients in isolation ward. A second blood CP was performed on resolution of the lesions (after about two week's duration). Blood hemoglobin (Hb), total leukocytes counts (TLC) and platelets counts (PC) were recorded on both occasions. Blood CP was also performed in thirty, otherwise healthy individuals and the same parameters (Hb, TLC, and PC) were recorded in these unaffected, healthy persons. The results were compared in both the groups and statistically analyzed by using student t test.

### **Results**

Patients belonged to a heterogeneous population. There were 52 males and 8 females. Majority (48) were between 20-30 years of age. The average age was 26.7 years. All of them reported 1-3 days after appearance of first rash. On base line investigations, mean Hb was 13.4 g/dl, TLC=6.1x10<sup>9</sup>/l and platelets were 159.6 x 10<sup>9</sup> /l. After resolution of the lesions (two weeks after initial presentation) the relative findings were 14.1 g/dl, 7.0x10<sup>9</sup>/l and 198x10<sup>9</sup>/l. Hb and TLC did not show any significant change; however, the improvement in platelet count was significant ( $p<0.05$ ). The mean findings in age and sex-matched healthy individuals were; Hb = 12.8 g/dl, TLC = 7.5x10<sup>9</sup>/l and PC=250.4x10<sup>9</sup>/l. On comparison, Hb and TLC were again in the same range but PC was significantly low ( $p<0.001$ ) in patients of chicken pox (both in the beginning as well as after the resolution of the disease).

### **Discussion**

Varicella virus is transmitted by the respiratory route through droplets and is highly contagious. Approximately 90% of persons without antibodies develop disease after exposure. Infected patients are contagious from 1 or 2 days before the lesions develop until all lesions are covered with scabs. After an incubation period of 10 to 21 days, a prodrome develops that consists of systemic symptoms such as headache, fever, and malaise. One or two days later, a maculo-papulo-vesicular rash develops. The rash follows a classic course, with several waves of lesions cropping up every 2 to 3 days. The entire course of the disease lasts 6 to 10 days. The body combats the primary infection with a cell-mediated antibody response. IgG, IgM, and IgA are produced within 2 to 5 days after infection and reach a maximum after 2 to 3 weeks.<sup>18</sup> The IgG crosses the placenta to provide passive immunity to the fetus. Although there can be significant variation in the number of lesions, all primary infections are believed to confer immunity. Rare reports exist in the literature regarding the development of recurrent clinical chickenpox.<sup>19</sup> Most childhood infections are benign; however, the disease may have serious sequelae in adults. Pneumonia can complicate up to 20% of cases, and can be deadly. Varicella encephalitis is believed to be an autoimmune phenomenon and fortunately is rare. Other complications include myocarditis, pericarditis, adrenal insufficiency, glomerulonephritis, hepatic dysfunction, and thrombocytopenic purpura.<sup>8-13</sup> Post infectious, immune-mediated thrombocytopenia may result in

bleeding complications 1-2 weeks after illness.<sup>20</sup> Purpura fulminans is a rare but life threatening complication of varicella reported in children and is caused by autoimmune protein S deficiency.<sup>21</sup> Anemia is generally not there, but relative leucopenia can be seen in patients of chicken pox as expected in almost all of the other viral infections but a significant thrombocytopenia is seen only in few viral infections. In one study, a subclinical thrombocytopenia was revealed in 55% of children affected by measles, in 25% of mumps, in 45% of varicella, in 30% of german measles and in 55% of infectious mononucleosis.<sup>22</sup> This was supposed to be due to production of antiplatelet antibodies in these viral infections. In another study serum IgG or, predominantly, IgM antibody binding to electrophoretically separated normal platelet membrane protein antigens were detected by immunoblotting in five children with thrombocytopenia associated with varicella. Glycoproteins GPIb, GPIIb, GPIIIa, and other 25-260 kilodalton (kDa) proteins were identified as target antigens, suggesting a transient autoimmune mechanism causing thrombocytopenia.<sup>23</sup> Platelet surface glycoprotein V (GPV) was found to be the target antigen in autoimmune thrombocytopenia in another study.<sup>24</sup> Relative leucopenia seen in our patients was not statistically significant when compared with matched healthy group. We also encountered relative thrombocytopenia in the vast majority of our cases but it was not dangerously low to herald any episode of bleeding. PC below 100 was seen in two patients who were rather closely monitored but in the

end they also showed improvement in count as other patients.

## Conclusion

Transient thrombocytopenia as an autoimmune phenomenon is a frequent occurrence in patients of chicken pox and can rarely be a fatal complication. Treating physician should have a closer look on platelet counts in such patients.

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