

ORIGINAL ARTICLE

VARICELLA PNEUMONIA IN ADULTS.

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ABSTRACT:

Background: Varicella pneumonia is the major and most frequent complication of chicken pox in healthy adults and carries a significant morbidity and mortality despite mechanical respiratory support and antiviral therapy. This study was undertaken to describe the frequency, severity and outcome of varicella pneumonia complicating chicken pox adult patients admitted in the hospital.

Material and Methods: This was a descriptive study of all adult patients with diagnosis of chicken pox who were admitted to the Infectious Diseases unit of Rashid hospital Dubai, UAE, from July 2005-Feb 2008. The patients were considered to have varicella pneumonia if the chest radiograph on admission showed changes consistent with acute infection (diffuse nodular/reticular changes), as reported by the radiologist. The patients with varicella pneumonia were treated by intravenous Acyclovir and those with severe varicella pneumonia in addition to Acyclovir, also received intravenous antibiotics, corticosteroids and mechanical ventilation.

Results: A total of 97 adult patients were entered in the study. Twenty-eight (28.8%) patients developed varicella pneumonia. Smokers and age of 35 years and above had more than three-fold increase of risk of developing varicella pneumonia, ($p < 0.01$ and $p < 0.005$ respectively). High frequency of varicella pneumonia was also observed in males ($p < 0.05$) and in patients with respiratory symptoms ($p < 0.0001$). Patients with varicella pneumonia had increased incidence of hepatic dysfunction, renal impairment ($P < 0.02$) and thrombocytopenia ($P < 0.02$). Out of 28 patients with varicella pneumonia, 10 (35.7%) required mechanical ventilation. Hospital stay was longer in patients with varicella pneumonia than those without pneumonia ($p < 0.002$). Five patients died which accounted for 17.8% of the patients with varicella pneumonia and 50% of the patients on ventilators.

Conclusion: In conclusion, high frequency of varicella pneumonia was observed in chicken pox patients with older age group, males, smokers and patients who presented with respiratory symptoms. The patients who developed varicella pneumonia also had involvement of the other organs leading to high morbidity and mortality. Early administration of Acyclovir, corticosteroids and mechanical ventilation may be of benefit for severe varicella pneumonia in adults.

Key words: Varicella, pneumonia, adults.

INTRODUCTION:

Varicella (chicken pox) is a common infectious disease of childhood. However, reports have

shown that the incidence of chicken pox in adults has doubled in recent years and this has been paralleled with an increase in hospital admissions ^{1,2} and mortality ³. The reason for this age shift is not known, though it may be the result of less exposure to the Varicella-Zoster virus (VZV), increased virus virulence, the immigration of non immune adults from the tropics and increasing vaccine coverage and as a result decrease in transmission may result in accumulation of susceptible adults followed by a shift of incidence into those older age group⁴. Varicella pneumonia is the most common and serious complication of chicken pox infection in adults and reported incidence in healthy adults is 25-fold greater than in children and despite aggressive specific and adjunctive management measures, it carries high mortality⁵. Varicella pneumonia is usually diagnosed by chest radiograph, which typically reveal diffuse nodular opacities, progressing to extensive air-space consolidation⁶. This study was conducted to describe the frequency, severity and outcome of varicella pneumonia complicating chicken pox in adult patients admitted in the hospital.

MATERIAL AND METHODS:

This was a hospital based descriptive (retrospective and prospective) study conducted from July 2005 to Feb 2008 at the Infectious Diseases Unit, Rashid hospital Dubai, UAE. Rashid hospital

is one of the biggest tertiary teaching hospitals in Dubai, accredited by the Joint Commission International (JCI). A separate proforma was filled for each case entered into the study. The study was designed to include demographics (age, sex, nationality); clinical information, radiological and biochemical changes observed in each patient and data was entered in proforma separately. Patients with HIV and on immune-suppressive therapy were excluded from the study. On admission, full blood count (FBC), blood sugar and urea electrolytes were done for all the patients, whereas, X-ray chest, Mycoplasma antibodies, Legionella antibodies, sputum culture and blood culture were also done for the patients with symptoms and signs suggestive of pneumonia. Liver function test (LFT), viral hepatitis profile, CT scan chest, coagulation profile and blood gases were done where and when it was necessary. The patients were considered to have varicella pneumonia if the chest radiograph on admission showed changes consistent with acute infection (diffuse nodular/reticular changes) ⁷, as reported by the radiologist (Fig.1). Management was done as per standard guidelines for the management of chickenpox and varicella pneumonia. All the patients with varicella pneumonia received intravenous Acyclovir 10mg/kg body weight in three divided doses for 7-10 days. The majority of the patients with varicella pneumonia also received antibiotic covering gram-positive cocci, particularly *Staphylococcus aureus*. Intravenous steroids, Immunoglobulin, ventilator support and hemofiltration were used as adjunctive or supportive therapy in a few patients; particularly in patients with severe varicella pneumonia associated with multi-organ failure.

Data was analyzed by SAS Enterprise Guide 4.1. Statical analyses included descriptive statistics, bivariate analysis i.e., t-test, chi-square and Analysis of Variance (ANOVA). A *p* value of <0.05 was taken as significant for difference in all statistical analysis.

RESULTS:

A total of 97 patients fulfilled the inclusion criteria. Overall, the mean age \pm SD of the patients under this study were 33.05 ± 9.85 years (15- 65 years) and males outnumbered females 84 (86.6%) vs. 13 (13.4%). There was no significant age difference between males and females. Most of the patients were expatriates who visited or lived in the UAE. Out of 97 patients, 72 (74.2%) were Indian and 25 (25.8%) were from Pakistan, Sri Lanka, Philippines and other

countries. The majority of the male patients were laborers, working in construction companies or agriculture fields and had positive history of contact with chickenpox patient. Skin rash with itching and fever were the most common presenting symptoms; whereas the patients with varicella pneumonia, in addition to the above symptoms also had cough, sputum, haemoptysis and shortness of breath (Table-1).

Out of 97 chicken pox patients, 28 (28.8%) patients developed pneumonia and all of them were males except one. The frequency of varicella pneumonia was noted high in older as compared to younger patients (mean age 37.3 ± 11 vs. 31.4 ± 8.1 years), males and smokers (Table-2). Chest symptoms (breathlessness, cough, sputum) as expected, were observed more common in patients with varicella pneumonia (Table-2). The skin lesions with mucosal involvement were noted more in patients with varicella pneumonia. Overall, 10 patients had evidence of septicemia and seven of them had varicella pneumonia. *Staphylococcus aureus* was the most common organism isolated (in 8 patients) on culture. Thrombocytopenia was observed in 53.5% patients with varicella pneumonia as compared to 37.6% those without pneumonia, with mean platelets count 144.03 ± 56.4 vs. $186.31 \pm 118.56 \times 10^3 \text{ cell/ul}$ ($p < 0.02$). Four patients with varicella pneumonia had deranged liver function test of acute hepatitis range (transaminase levels more than 10 fold of reference range). Blood urea was above the reference range in 32.1% patients with varicella pneumonia, whereas, it was elevated only in 4.3% patients without pneumonia, with mean blood urea 40.89 ± 30.21 vs. $26.71 \pm 14.49 \text{ mg/dl}$ ($p < 0.02$). Seven patients developed acute respiratory distress syndrome and five of them had multi-organ failure.

Intravenous Acyclovir was given to all patients with varicella pneumonia and 21 (75%) of them also received intravenous antibiotics. Corticosteroids were given as adjunctive therapy in five

patients. Hemofiltration and Immunoglobulin were used in one patient. Among 28 varicella pneumonia patients, 10 (35.7%) patients required mechanical ventilation due to severe respiratory distress. Mean hospital stay was 7.47 ± 4.65 days (3-25 days) and it was longer in patients with varicella pneumonia than those without it, with mean hospital stay 10.28 ± 5.98 vs. 6.33 ± 3.43 days ($p < 0.002$). Five (17.8%) patients with varicella pneumonia died which accounted for 50% of the mechanical ventilated patients. The patients without varicella pneumonia were discharged healthy without significant morbidity.

Fig.1. X-ray chest shows reticulo-nodular shadows involving both lungs, typical of varicella pneumonitis.

Table.1. Clinical data of 97 chicken pox patients, with & without Varicella pneumonia.

Clinical parameters	Without V.Pneumonia (Total patients 69)		With V.Pneumonia (Total patients 28)	
	No of Pt.	%	No of Pts.	%
Males	57	82.6	27	96.4
Females	12	13.4	1	3.6
Skin rash	67	97.1	27	96.4
Fever	59	85.5	26	92.8
Itching	44	63.7	19	67.8
Cough	16	23.1	21	75
Smoking	16	23.1	20	71.4
Breathlessness	5	7.2	16	57.1
Sputum	10	14.5	20	71.4
Haemoptysis	1	1.4	9	32.1
Diabetes	7	10.1	4	14.2
Septicemia	3	4.3	7	25
Mortality	0	0	5	17.8

Table.2. Factors associated with high frequency of varicella pneumonia.

Parameter	COR (95% CI)	X ²	<i>p</i> Value
Age >35 years	3.53 (1.41-8.82)	7.58	< 0.005
Males	6.26 (1.38-50.4)	4.72	< 0.05
Smokers	3.03(1.22-7.55)	5.86	< 0.01
Breathlessness	17.06(5.25-55.45)	28.93	< 0.0001
Cough	9.93(3.57-27.61)	22.42	< 0.0001
Sputum	17.75(5.11-42.53)	29.91	< 0.0001

DISCUSSION:

The incidence of varicella pneumonia has been reported variably. In this study, 28.8% cases developed varicella pneumonia; whereas other investigators have reported the incidence of varicella pneumonia in 5-50% adults with chicken pox^{8,9}. Risk factors for the development of pneumonia in chicken pox include older age⁹, male sex¹¹, smoking⁷, immunodeficiency¹², pregnancy¹³, skin lesions >100, history of contacts with chickenpox, chest symptoms at presentation¹⁰ and patients with chronic lung disease⁹. The findings in this case series are consistent with the above reports and we observed that males, patients with age 35 year or above,

smokers and patients who presented with respiratory symptoms had high frequency of varicella pneumonia (Table-2).

Varicella pneumonia is a serious complication of chicken pox and it causes high mortality. Gregorakos et al have reported mortality rate 10-30% in general population, 40% in pregnancy and greater than 50% in immunocompromised patients⁸. In our case series, mortality rate was 17.8%, a finding which constants with the above report as most of our patients were immunocompetent healthy males. Felman S in his study has observed that the mortality rate approaches 50% in patients who experience respiratory failure, which requires mechanical ventilation, despite appropriate supportive and aggressive therapy¹⁴. In this study, we also had the same observation as 10 patients with varicella pneumonia required mechanical ventilation due to severe respiratory distress and five (50%) of them expired. Intravenous Acyclovir appears effective against varicella pneumonia and it reduces mortality in previously healthy adults if started early¹⁵. The use of corticosteroids as adjunctive therapy for the treatment of life threatening varicella pneumonia is controversial and has been not well studied. However, an uncontrolled study evaluating 15 adult patients with varicella pneumonia suggested that corticosteroids might reduce the period of hospitalization and the mortality¹⁶. In our study, five patients received corticosteroids as adjunctive therapy and two of them died.

CONCLUSION:

In conclusion, high frequency of varicella pneumonia was observed in chicken pox patients with higher age group, males, smokers and patients who presented with respiratory symptoms. The patients with varicella pneumonia also had involvement of the other organs which is an indicator of disseminated disease in these patients and it causes multi-organ failure leading to high morbidity and mortality. Early administration of Acyclovir, corticosteroids and mechanical

ventilation may be of benefit for severe varicella pneumonia in adults.

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