ORIGINAL ARTICLE (APMC – 511) DOI: 10.29054/APMC/18.511

ARDS in Chicken Pox Pneumonia; Is Co Morbidity Really a Contributing Factor?

Umair Ahmad, Aamir Shaukat, Hooria Aamir, Uzma Ismail, Awais Ahmed

ABSTRACT

Introduction: Chicken Pox is stated to be the most contagious disease of childhood. Incidence of varicella in adults is on rising trend and it's a source of morbidity and mortality in adult population. Out of various complications of chicken pox, pneumonia is the most common and frequent complication in healthy adults. The mortality rate for patients with chicken pox pneumonia varies from 10% to 33% but in patients needing mechanical ventilation, it may approach 50%. Various risk factors have been studied for development of varicella pneumonia. These include male gender, smoking, chronic lung disease, immunosuppression, pregnancy, history of contact with a patient with chicken pox, severity of skin rash and time of presentation to the hospital may also be relevant. **Objectives:** To determine the frequency of different risk factors in patients with chicken pox pneumonia presenting in Allied Hospital Faisalabad. **Study Design:** Cross Sectional Descriptive Study. **Setting:** Medical Unit II, Allied Hospital Faisalabad. **Duration:** The data was collected from 1st January 2017 to 30 September 2017. **Methodology:** A retrospective chart review of adult patients (16 years old and above) both male and female with diagnosis of Varicella Pneumonia was conducted. Age; sex; clinical presentation; smoking history; duration between onset of disease and presentation to hospital; history of co-morbid factors; as well as outcomes was documented in these patients. The data was analyzed using SPSS version 12.0 statistical software. Frequency and percentages were calculated for the risk factors of pneumonia, gender of the patients and patients needing ventilator therapy. **Results:** 27 patients out of 343 patients with chicken pox developed varicella pneumonitis All the patients with pneumonia went into ARDS (100%). 25 patients (92.6%) needed ventilatory support. 23 out of 27 patients were male. Smoking was found to be a risk factor in 48.1% patients. 3 patients (11.1%) were immunocompromised. 55.5% of the patients (15 out of 27) were late presenters. **Conclusion:** Effect and Impact of different co-morbidities on patients of chicken pox is important not only for medical professional but also for general public in order to prevent life threatening complication like pneumonia initiating treatment early and timely referral to tertiary care hospital for proper management.

Keywords: Vericella Zoster, Pneumonia, Smoking

Corresponding Author
Dr. Umair Ahmad
Assistant Professor, Medicine
Faisalabad Medical University,
Faisalabad-Pakistan
Contact: +92 300-9669550
Email: dr.umairahmed123@gmail.com

Submitted for Publication: 06-07-2018 *Accepted for Publication: 13-09-2018*

Article Citation: Ahmad U, Shaukat A, Aamir H, Ismail U, Ahmed A. ARDS in Chicken Pox Pneumonia; Is Co Morbidity Really a Contributing Factor?. APMC 2018;12(4):276-9.

INTRODUCTION

Varicella is also known by the name chicken pox. It's stated to be the most contagious disease of childhood. Caused by varicella zoster virus, it usually runs a benign course. It is often seen that children have milder disease than that in adults.[1] Usual symptoms of chicken pox include fever, generalized malaise, headache, abdominal pain and a generalized vesicular rash. However, incidence of varicella in adults is on rising trend over recent years and it's a source of morbidity and mortality in adult population. In adults mortality is higher as compared to infants and children and is estimated to be about 31/100,000 which is much more than in infants and children.[2] Studies show that in adults and immunocompromised patients, it can be aggressive with increased mortality and morbidity.[3] Out of various complications of chicken pox, pneumonia is the most common and frequent complication in healthy adults.[4] In a recent study published it has been suggested that approximately 5 -15% of the adult patients with chicken pox develop some form of pulmonary disease.[5] There is no data available showing exact number of patients who develop pneumonia as most studies conducted consist of small case series or retrospective review of patients charts. However, it is estimated to be 1 in 400 patients of chickenpox.[6] Patients may show symptoms of impaired gaseous exchange with progressive hypoxemia and are at increased risk of respiratory failure.[7] There is further 19.8% increase in the incidence of pneumonia after ventilation.[8] The mortality rate varies from 10% to 33% but in patients needing mechanical ventilation, it may approach 50%.[9] Various risk factors have been studied for development of varicella pneumonia and these include male gender, smoking, chronic lung disease, immunosuppression, pregnancy, history of contact with a patient with chicken pox, severity of skin rash,[10,11] and time of presentation to the hospital.

The rationale of this study was to find out different risk factors which predispose to pneumonia in patients with chicken pox. Early detection of these risk factors and early treatment of such patients will help prevent the development of pneumonia in such patients and decrease morbidity and mortality.

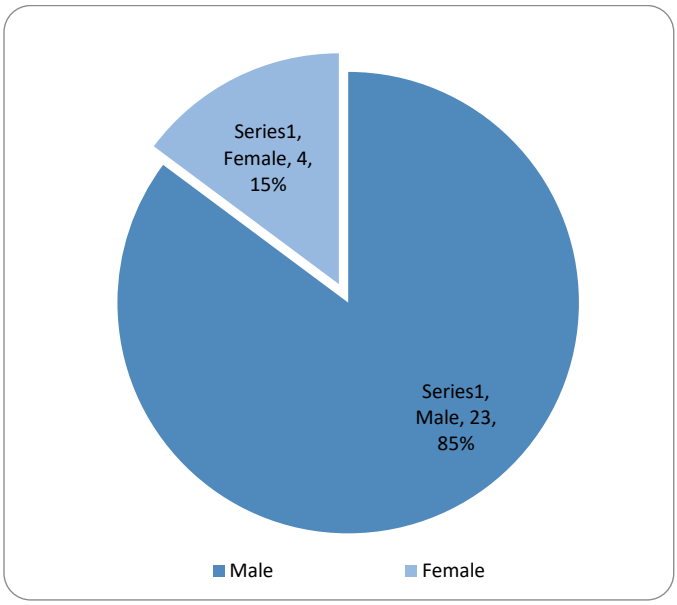
The objective of this study was to determine the frequency of different risk factors in patients with chicken pox pneumonia presenting in Allied Hospital Faisalabad.

METHODOLOGY

Study Design: Cross Sectional Descriptive Study.
Settings: Medical Unit II, Allied Hospital Faisalabad.
Duration: 1st January 2017 to 30 September 2017
Methods: After approval from the ethical review committee, a retrospective chart review of adult patients (16 years old and above) both male and female with diagnosis of Varicella Pneumonia admitted to Allied Hospital, Faisalabad, which is a tertiary care Health Facility was conducted. The following demographic features were documented in these patients: age; sex; clinical presentation; smoking history; duration between onset of disease and presentation to hospital; history of co-morbid factors; as well as outcomes. Varicella was diagnosed based on clinical findings of fever and typical characteristic vesicular skin rash. Diagnosis of Varicella Pneumonia was based on development of respiratory symptoms and signs with radiological findings of diffuse interstitial or nodular infiltrates within 10 days following the onset of clinically evident Varicella infection. History of Smoking, Diabetes Mellitus, Previous or present lung pathology, Late Presentation (> 5 days after the onset of varicella rash), History of patient being on any Immunosuppressive Medications, Chronic liver disease (child Class B & C) due to Hepatitis B & C were identified as risk factors of development of Pneumonia in patients with chicken Pox.
The data was analyzed using SPSS version 12.0 statistical software. Mean ± SD was calculated for the age of the patients. Frequency and percentages were calculated for the risk factors of pneumonia, gender of the patients and patients needing ventilator therapy.

RESULTS

From January 2017 to September 2017, a total of 343 patients presented to Allied Hospital, Faisalabad with chicken pox. Of these patients, 27 patients developed varicella pneumonia and were included in our study. Their data was analyzed and interpreted.
All the patients with pneumonia went into ARDS (100%). 25 patients (92.6%) needed ventilator support and only 2 patients (7.4%) did not need ventilator support and recovered on conservative therapy. 2 patients expired within a few hours after presentation to hospital before mechanical ventilator could be available for them. 23 patients (85.2%) were admitted in ICU for mechanical ventilation. All the patients were diagnosed on the basis of typical x-ray findings and arterial blood gases examination.
Upon review of risk factors, 23 out of 27 patients were male (Graph No 1). This shows a high percentage (85%) of male's patients indicating that male gender is a risk factor for development of ARDS.
Smoking was found to be a risk factor in 48.1% patients i.e.13 out of 27 patients. All the patients who smoked were male and no females were found to be smokers (Table 1). 4 of these patients had COPD (14.8%) and only 1 patient had asthma (3.7%). (Table 1).
3 patients (11.1%) were immunocompromised. One of the patients was on methotrexate therapy for rheumatoid arthritis; other one had iatrogenic cushingoid and the last one was HIV positive. (Table 1).
Uncontrolled Diabetes mellitus was present in 3 patients (11.1%). (Table 1).
8 patients (29.6%) were either HCV or HBV positive. Of these patients, two had decompensated liver cirrhosis due to HCV. 2 patients had chronic liver disease without decompensation.2 had incidental finding of HBV and HCV and were not known cases. (Table 2).
Patients who presented to hospital 5 or more days after the development of rash were considered to have a late presentation. There were 55.5% patient (15 out of 27) who were late presenters.

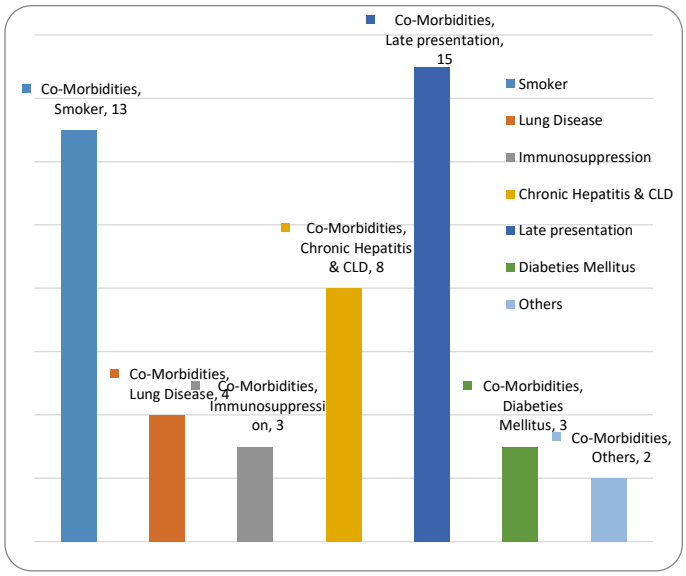


Graph 1: Gender of Patients

Other risk factors included long term epileptic intake in one patient and anti-tuberculous therapy in another one. Graph No 2 shows the graphic description of all the risk factors.

Table 1: Risk Factors in Patients with Chicken Pox Pneumonia

		Co-Morbidities	Frequency
Risk Factors in Patients with Chicken Pox Pneumonia	Smoker	13	48.1%
	Lung Disease	4	14.8%
	Immunosuppression	3	11.1%
	Chronic Hepatitis & CLD	8	29.6%
	Late presentation	15	55.5%
	Diabetes Mellitus	3	11.1%
	Others	2	7.4%



Graph 2: Risk factors for development of pneumonia

DISCUSSION

Varicella pneumonia is cause of morbidity and mortality in adult population who did not chicken pox during their childhood.[12] It leads to respiratory failure and ARDS which requires mechanical ventilation and intubation.[9]

Our study concluded that most of the adult patients who developed chicken pox pneumonia were male (85%). This conclusion is similar to what drawn by a study in North London during year 1998 and a case series reported in Singapore in 2004.[13,14] The fact that most patients developing varicella pneumonitis are males is explained by the observation that male are more frequently smokers as compared to females.[15] No female was found to be a current or previous smoker in our study.

Smoking has been proven to be a major risk factor for a severe disease in varicella pneumonia by various studies in the past. Our results are in accordance with these studies as patients were cigarette as well as Huqqa smoker. One of these studies published by Ellis et al successfully proved that smoking was a risk factor for development of severe pulmonary disease.[16]

Although no association was found between asthma and severity of varicella pneumonitis, chronic lung disease was found to be a contributing factor to severe pulmonary varicella. Only one patient included in our study was asthmatic and four patients had chronic obstructive airway disease. Out of 3 patients with COPD, only one patient survived and others expired on mechanical ventilatory support indicating severe disease and mortality from smoking and COPD.

Another risk factor for varicella pneumonia is immunosuppression. One of our patients was on Methotrexate therapy as a treatment of rheumatoid arthritis when she presented to hospital. She ultimately developed fatal disease and expired on ventilatory support. A case report was presented from Israel stating a similar case where patient was on methotrexate therapy for psoriatic arthritis.[17] Other causes included in this heading are iatrogenic cushingoid and HIV. They were present in one patient with ARDS each. A study conducted in England and Wales found immunosuppression to be a risk factor for high mortality in varicella ARDS as compared to immunocompromised patients[18] although this study didn't split immunosuppression into various subgroups as in our study.

Uncontrolled Diabetes mellitus was also noted to be a risk factor for development of chicken pox pneumonia. Three patients in our study had diabetes mellitus which was poorly controlled over oral hypoglycemic drugs and Insulin.

Hepatitis B and C positivity was found in 8 patients. Two of these patients had decompensated liver cirrhosis Child Class B, C. One of these patients underwent laparoscopic cholecystectomy during active phase of chicken pox and later on presented with ARDS. She expired later-on on mechanical ventilation. Another of 2 patients had Chronic liver disease due to HCV but they showed no signs of decompensation. One patient out of 8 was taking anti-viral therapy for HCV. Previously Hepatitis B and C have not been studied as risk factors for development of ARDS.

The patients who presented to hospital 5 days or after the appearance of rash were found to be at increased risk of development of severe pulmonary disease. 15 out of 27(55.5%) patients presented to hospital late. The criteria were defined on the basis of being late to a tertiary care hospital and presentation to primary care or private doctors was not considered as anti-viral therapy was not started in any referred patient. This raises the need for education of doctors in primary and secondary care hospitals as well as in private clinics/hospitals about early commencement of anti-viral therapy for chicken pox.

CONCLUSION

This study concludes that awareness of different co-morbidities in patients of chicken pox is very important not only for medical professional but also for general public so as to prevent life threatening complication like pneumonia in patients with chicken pox by starting early treatment in these patients.

REFERENCES

1. Shrivastava SR, Shrivastava PS, Ramasamy J. Epidemiological investigation of a case of chickenpox in a medical college in Kancheepuram, India. Germs. 2013;3(1):18-20.
2. Cohen J, Breuer J. Chicken Pox: Treatment. BMJ Clin Evid. 2015:2:912-6.
3. Khaleel HA, Abdelhusseien HM. Clinical Epidemiology of Chicken Pox in Iraq from 2007-2011. Glob J Health Sci. 2012;5(1):180-6.
4. Mendes MD, Yeh-Li H, Romano TG, Santos EV, Hirota AS, Kono BM, et al. Varicella associated acute respiratory distress syndrome in an adult patient: an example for extracorporeal respiratory support in Brazilian endemic diseases. Rev Bras Ter Intensiva. 2014;26(4):410–5.
5. Denny JT, Rocke ZM, Mcrae VA, Denny JE, Fratzola CH, Ibrar S, et al. Varicella Pneumonia: Case Report and Review of a Potentially Lethal Complication of a Common Disease. J Investig Med High Impact Case Rep. 2018;18(5);6-10.

6. Avnon LS, Smolikov A, Almog Y. Varicella pneumonia in southern Israel: clinical characteristics, diagnosis and therapeutic considerations. Isr Med Assoc J. 2009;11(5):261-5.
7. Chou CC, Shen T-C, Tu C-Y. Calcified pulmonary nodules. Eur J Intern Med. 2015;26(8):27-8.
8. Sultan MA, Masood M, Shabbir SG, Naqvi SUB, Sheikh S, Butt MA. Frequency of Ventilator Associated Pneumonia in Pediatric ICU of Allied Hospital, Faisalabad. APMC. 2017;11(3):261-4.
9. Mirouse A, Vignon P, Piron P, Robert R, Papazian L, Géri G et al. Severe varicella-zoster virus pneumonia: A multicenter cohort study. Critical Care. 2017;21(1):137-41.
10. Güldane K, Zafer K, Oya H, Ilker D, Fadil V. Complications of Varicella in Healthy Children: Is It Increasing? J Pediatr Res. 2015;2(1):74-7.
11. Feldman S. Varicella zoster virus pneumonitis. Chest. 1994;106(7):22–7.
12. Bovill B, Bannister B. Review of 26 years hospital admissions for chickenpox in North London. J Infect. 1998;36(1):17–23.
13. Ho BC, Tai DY. Severe adult chickenpox infection requiring intensive care. Ann Acad Med Singapore. 2004;33(4):84-8.
14. Ellis ME, Neal KR, Webb AK. Is smoking a risk factor for pneumonia in adults with chickenpox? Br Med J (Clin Res Ed). 1987;18(6);294-300.
15. Anwar SK, Masoodi I, Alfaifi A, et al. Combining corticosteroids and acyclovir in the management of varicella pneumonia: a prospective study. Antivir Ther. 2014;19(2):221-4.
16. Ellis ME, Neal KR, Webb AK. Is smoking a risk factor for pneumonia in adults with chickenpox? Br Med J (Clin Res Ed). 1987;294(6578):1002-8.
17. Helviz Y, Hersch M, Raveh D, et al. Varicella pneumonia in a woman receiving methotrexate for psoriatic arthritis. Isr Med Assoc J. 2014;16(3)175-6.
18. Joseph CA, Noah ND. Epidemiology of chickenpox in England and Wales, 1967-1985. BMJ 1988;296(6623):673-6.

AUTHORSHIP AND CONTRIBUTION DECLARATION

AUTHORS	Contribution to The Paper	Signatures
Dr. Umair Ahmad Assistant Professor, Medicine FMU / Allied Hospital, Faisalabad	Manuscript writing, Collection of data and analysis	
Prof. Dr. Aamir Shaukat Professor of Medicine/ HOD Medical Unit-II FMU / Allied Hospital, Faisalabad	Proof Reading & Analysis of data	
Dr. Hooria Aamir Associate Professor, Physiology Faisalabad Medical University, Faisalabad	Literature Review	
Dr. Uzma Ismail Medical Officer, Medicine Allied Hospital, Faisalabad	Data Collection	
Dr. Awais Ahmed Interventional Radiologist Hameed Latif Hospital, Lahore	Writing Literature, Collection of Data