http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v8i11.31

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

A Study on Clinical Profile and Outcome of Bilateral Pneumonitis

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Abstract
Our study focussed purely on bilateral pneumonitis (both infective and non-infective) which evolved in the community excluding all hospital acquired, aspiration pneumonitis developed in the hospital/ICU settings, malignancy and immunocompromised state where risk of bilateral involvement of lungs is very high.
Objectives: *To analyse the clinical, etiological and radiological features of bilateral pneumonitis, to study mortality in patients with bilateral pneumonitis in relation to PSI grading.*
Methodology:
Study Design: *Observational study,*
Study Population: *All the patients who were diagnosed with bilateral Pneumonitis at OPD/emergency wards and later admitted in medical or disaster wards,*
Study Setting: *RL JALAPPA HOSPITAL, KOLAR,*
Study Period: *4 months, Sample size: 300.*
Results & Discussion: *In the present study, the mean age group of the patients was 49.30 ± 13.47. Mahendra[8] et al reported that mean age of the patients was 54.03 years. Nagesh kumar[9] et al reported that the mean age of the patients studied was 56.07± 16.52 years. Bronchopneumonia was the commonest chest X-ray finding in the present study. Nagesh Kumar[9] et al reported that the most common chest radiograph finding was lobar consolidation in 44.2% of all cases, followed by patchy consolidation in 39.3% of the cases. Interstitial pattern was observed in 4.9% of cases and cavitory lesions were seen in one case, which was positive for S. aureus. In the present study no mortality seen in PSI class II and III but it is around 23.35% (39 patients) in PSI class IV and 69.04% (29 patients) in PSI class V. More than 50% died in PSI class V due to dreadful complications of pneumonitis and MV/NIV adverse effects.Kim[16] et al in their study on Pneumonia severity index in viral community acquired pneumonia in adults reported that In the PSI class V, the mortality rate was 27 times that of the PSI class I.*
Keywords: *Bilateral pneumonitis, PSI grading.*

Introduction

Pneumonitis is a more general term that describes the inflammatory process in the lung which predisposes and places the patient at risk to microbial invasion. It includes both infectious and non-infectious causes. Technically, pneumonia is a type of pneumonitis because the infection causes inflammation[1]. Pneumonitis, however, is usually used by clinicians to refer to non-infectious causes of lung inflammation.But in our study we label

pneumonitis to represent both infectious and non-infectious causes of lung inflammation. Pneumonitis that goes unnoticed or untreated can cause irreversible lung damage like pulmonary fibrosis. In severe cases, pulmonary fibrosis can cause right heart failure, respiratory failure and death.

The extent of pneumonitis predicts the outcome i.e bilateral involvement carries poor prognosis followed by unilateral multilobar involvement and finally comes unilateral single lobe involvement which carries better prognosis. Also the clinical, etiological, radiological and complications profile differ among these variants.

The pneumonitis which develops in hospital settings is mostly bilateral and most probably due to hospital acquired infections, VAP, aspiration pneumonitis. The most common causes were found to be MDR bacterial infections or aspiration of gastric and oral contents and it had been published in multiple studies in the past. But the clinical profile of bilateral pneumonitis which developed outside the hospital settings has not been studied exclusively till now.

The most common cause of bilateral or unilateral pneumonitis is infection worldwide. Globally, three million people die annually due to pneumonia which exceeds all other infectious causes including tuberculosis, malaria, and human immunodeficiency virus (HIV) infection[2].

The Global Burden of Disease Study in 2010 reported that lower respiratory tract infections i.e pneumonia which is the fourth most common cause of mortality globally,

Which exceeded only by is chaemic heart disease (IHD), chronic obstructive pulmonary disease (COPD), stroke and they are the second most frequent reason for years of life lost.[3] Within Europe, Community- Acquired Pneumonia (CAP) is the leading cause of death due to infection, with about 90% of deaths due to pneumonia occurring in people aged >65 years. Pneumonia places a significant burden on healthcare resources and society, with associated annual costs estimated at around € 10 billion in Europe, mainly due to hospitalization and lost workingdays[4.]

Accurate assessment of disease severity, risk stratification, prediction of outcomeare therefore prerequisite for the safe and accurate identification of patients with CAP to manage on outpatient or inpatient basis which prevents complications. Several global organizations have developed prediction rules and adopted guidelines to stratify patients with CAP based on estimated mortalities for the identification of CAP patients that may be treated in an outpatient setting in order to enhance hospital referral and lower hospital admission rates[5] The pneumonia severity index (PSI) is a widely propagated scoring system in North America that assesses the risk of death in a two-stepalgorithm[6]. New approaches for fast clinical (lungultra sound) and microbiological (molecular biology) diagnosis are promising. Studies are needed that focus on the long-term management of pneumonia[7]

As the bilateral pneumonitis is seen and studied most commonly in hospitalised and ICU patients with hospital acquired infections, aspiration pneumonitis; clinical profile and outcome in Bilateral pneumonitis depending on varied etiology in a various group of patients living in the community remains under documented and requires comprehensive study. Our study focussed purely on bilateral pneumonitis (both infective and non-infective) which evolved in the community excluding all hospital acquired, aspiration pneumonitis developed in the hospital/ICU settings, malignancy and immunocompromised state where risk of bilateral involvement of lungs is very high.

Objectives

- To analyse the clinical, etiological and radiological features of bilateral pneumonitis.
- To study mortality in patients with bilateral pneumonitis in relation to PSI grading.

Methodology

Study Design: Observational study

Study Population: All the patients who were diagnosed with bilateral Pneumonitis at OPD/ emergency wards and later admitted in medical or disaster wards

Study Setting: RL JALAPPA HOSPITAL, KOLAR

Study Period: 4 months

Sample Size: 300

Inclusion Criteria: Age>14 years, Patients who have radiological evidence along with/without clinical symptoms and signs of bilateral pneumonitis. Patients with clinical symptoms along with significant signs in both the lungs.

Exclusion Criteria: Hospital acquired/ ventilator associated/ Health care associated pneumonia, Lung malignancy, Pregnancy, Patients who came with generalized anasarca or dyselectrolytemia due to other systemic causes like cardiovascular, renal, hepatobiliary diseases where hyponatremia due to pneumonitis is overestimated. Drug induced hyponatremia. Immunocompromised patients.

Methods of Data Collection

All clinically suspected bilateral pneumonitis patients had lateral and posteroanterior (PA) projections to categorise radiographic involvement. All chest radiographs were reviewed by one specialist in radiology to evaluate the radiographical pattern of infiltrate, number of lobes involved, and the presence of pleural effusion and atelectasis. Note that the specialist was blinded to the clinical data. Thus all the patients fulfilling the inclusion criteria were included in this study. The detailed relevant history and clinical examination were done according to predesigned and pretested format. The suspicious and previously undocumented cardiovascular cases were evaluated, 2D ECHO done on day-1 and excluded all the

LVF cases with pneumonia from the study to avoid the bias in view of

a) Pulmonary oedema versus pneumonia and

b) Hyponatremia due to cardiovascular disease.

The patients were classified according to PSI score classification. All the cases were Evaluated, treated and followed during the hospital stay to find the various causes, risk factors and outcome with all the facilities available in the hospital.

Statistical Analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Continuous data was represented as mean and standard deviation.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results

Out of 300 study subjects 175(58.3%) were males and 125(41.7%) were females.

Majority of the patients i.e. 78 (26%) in the present study belonged to the age group of 51-60 years followed by 74(24.67%) in 61-70 years age group. The age group of 21-30 observed less number of patients i.e. 27(9%). The mean age of the patients was 49.30 ± 13.47.

Clinical symptoms the patients presented with were 165 patients with Fever(55%), 113 with Cough(37.67%), 195 with Breathlessness(65%) , 9 with Altered sensorium (3%), 9 with Haemoptysis (3%) and 7 with loss of weight (2.33%).

The co-morbidities observed in the study were Hypertension (39.7%), Diabetes (21%), OSA (21%), Cerebro vascular disease (2.3%), no comorbidity in 30% patients.

The major risk factors observed among patients include preceding URTI in 129 patients (43%), COPD in 73 (24.3%), PTB in 17 (5.7%). 81 patients(27%) didn't present with any risk factor. 123 patients (41%) were having smoking habit and 115 patients (38.3%) had the habit of alcohol consumption.

Table 1: Distribution of subjects according to aetiology

	Frequency	Percentage
Bacterial	106	35.3%
H1N1	57	19%
PTB	17	5.7%
Connective Tissue Disorder & vasculitis	13	4.3%
Fungal	2	0.7%
Hypersensitivity	3	1%
Idiopathic Interstitial lungdisorder	5	1.67%
Occupational	3	1%
Aspiration	4	1.33%
Unknown	90	30%

Out of 300 bilateral pneumonitis cases Majority i.e. 106 cases (35.3%) were with a bacterial etiology and 57 cases (19%) with viral (H1N1) etiology. Pulmonary TB was seen in 17 cases(5.7%), connective tissue disorders was observed in 13 cases (4.3%), idiopathic interstitial lung disorder in 5 cases(1.67%), aspiration pneumonitis (Non hospital acquired) in 4 cases(1.33%), occupational and hypersensitivity among 1% of the cases each. Fungal (0.7%) etiology was observed in 2 patients.

Bronchopneumonia was observed among 62.7% (188) of the cases, Lobar pneumonia was observed among 20%(60) of the cases and 17.3%(52) of the patients showed interstitial infiltrates on chest X-ray.

Out of 300 patients totally, oxygen support was warranted for 191 patients (63.67%), non-invasive ventilation was administered in 75 patients (25%) and mechanical ventilation was administered in 34 patients (11.3%)..

Pneumonia severity index (PSI) score was used to calculate the probability of mortality and morbidity among pneumonitis patients during their admission. The index is broadly categorised into 5 classes. Class II was observed among 6%(18) of the cases, class III among 24.3%(73) of the cases, class IV among 55.7%(167) of cases, and class V among 14%(42) of the cases.

Table 2: PSI vs Outcome

Outcome	Class II	Class III	Class IV	Class V
O2 support	3	33	136	19
NIV	0	0	24	11
MV	0	0	4	12

Among those with class II(18) and III(73), 16.67%(3) and 45.2%(33) respectively needed oxygen support and no one needed NIV/MV support. Among those with PSI class IV(167) , 81.44%(136) required oxygen support, 14.37% (24) required NIV and 2.39%(4) required MV initially after which some of them needed other modes of support depending on their condition during their hospital stay. Among those with PSI class V(42), 45.23%(19) were managed with oxygen support, 26.2%(11) were managed with NIV and 28.58%(12) required MV initially and later some of them needed other modes of ventilation depending on their condition.

Total 68 patients (22.66%) died both directly and indirectly through pneumonia and its complications respectively. Out of 68 patients who died, 45 were males (66.17%) and 23 were females (33.82%).

Maximum patients that died were equally distributed among all age groups i.e 25 patients in > 60 yrs age group; 25 patients in 40-60 yrs age group and 18 patients in 30 -40 yrs age group. Least mortality in < 30 yr age group i.e 5 patients. But there is no much significant difference in mortality between elderly (60-70yrs) and younger age group patients(30-40 yrs).

No mortality seen in PSI class II and III but it is around 23.35% (39 patients) in PSI class IV and 69.04% (29 patients) in PSI class V. More than 50% died in PSI class V due to dreadful complications of pneumonitis and MV/NIV adverse effects.

In the present study, major complications observed in the cases include pleural effusion in 103 cases (34.3%), septic shock in 56(18.6%), ARDS in 54 (18%), acute kidney injury in 43(14.3%), empyema in 22(22%). 7.3% did not show any complications

Discussion

In the present study, the mean age group of the patients was 49.30 ± 13.47. Mahendra[8] et al reported that mean age of the patients was 54.03 years. Nagesh kumar[9] et al reported that the mean age of the patients studied was 56.07± 16.52 years.In the present study, it was observed that 58.3% were males and 41.7% were females. Similar findings reported by mahendra[8] et al i.e. 66% were males in their study. Study conducted by Gonzalez[10] et al where 64% of patients hospitalized for CAP were men. Men presented with more toxic habits, comorbidities and higher PSI score which is similar to the present study findings.

Majority of the patients presented with breathlessness followed by fever whereas loss of weight was observed in very few cases. Bashir Ahmed[11] et al reported that in their study of clinical profile of CAP, Maximum number of patients presented with cough followed by fever. Nagesh kumar[9] et al in their study identified Dyspnea was significantly more common in patients with typical pneumonia (79.6%) than in atypical pneumonia. Bansal S[12] et al in their study reported that most common presenting symptoms were fever.

The major risk factors observed in the present study among patients include preceding URTI in 129 patients (43%), COPD in 73 (24.3%), PTB in 17 (5.7%). 81 patients(27%) didn't present with any risk factor.

Antoni Torres[3] reported that lifestyle factors associated with an increased risk of CAP included smoking, alcohol abuse, being underweight, having regular contact with children and poor dental hygiene. Mahendra[8] et al concluded that prior respiratory infection, obesity, alcoholism and old age (>60 years) were observed to be important risk factors for severe CAP.

Almirall J[13] identified significant risk factors in their study which include current smoking of >20 cigarettes per day (odds ratio (OR)=2.77compared with never- smokers), previous respiratory infection (OR=2.73), and chronic bronchitis (OR=2.22).In our study, smokers seem to have increased morbidity and complications compared to non smokers which is in accordance with the previous studies.

Mahendra[8] et al also reported that most common organisms in their study were Klebsiella (8%), Influenza (8%), and Pseudomonas (5%)

Nagesh Kumar[9] et al in their study identified that the common etiological agents were Streptococcus pneumoniae (15.6%) and Klebsiella pneumoniae (8.2%) among typical pneumonia. Most of the findings in our study show similarity with the above studies.

Bronchopneumonia was the commonest chest X-ray finding in the present study.

Nagesh Kumar[9] et al reported that the most common chest radiograph finding was lobar consolidation in 44.2% of all cases, followed by patchy consolidation in 39.3% of the cases. Interstitial pattern was observed in 4.9% of cases and cavitary lesions were seen in one case, which was positive for S. aureus.

Sandeep Kumar[14] et al reported that the radiological data in their study showed a predominance of lobar pneumonia in 96 (80%) patients followed by bronchopneumonia in 20 (16.7%) and interstitial pneumonia in 4 (3.3%) patients. Bansal S[12] et al in their study identified the pattern

In study conducted by Bansal[12] et al, empyema and shock were common complications identified. Khawaja[15] et al reported that septic shock was a dreadful complication and was found to be independently associated withmortality, Our present study is in accordance with this study.

In the present study no mortality seen in PSI class II and III but it is around 23.35% (39 patients) in PSI class IV and 69.04% (29 patients) in PSI class V. More than 50% died in PSI class V due to dreadful complications of pneumonitis and MV/NIV adverse effects.

Kim[16] et al in their study on Pneumonia severity index in viral community acquired pneumonia in adults reported that In the PSI class V, the mortality rate was 27 times that of the PSI class I.

In our study, out of 68 patients who died, 45 were males (66.17%) and 23 were females (33.82%). Our present study showed that mortality in bilateral pneumonitis is raising in younger age group than that in elderly which is in contrary to the findings in unilateral pneumonia where most of the studies showed that mortality is higher in elderly than young patients.

While a British Thoracic Society multi-centric study recorded a surprisingly low mortality of 5.7%[17], a higher mortality (ranging from 21% to 25%) has been reported in other studies[18,19] . However, in another Indian study a significantly higher mortality was noticed in patients aged 50 years or above and in those with underlying co-morbid conditions[10.]

Conclusion

Radio graphical bilateral pneumonitis is an independent risk factor for mortality and that the prognosis for bilateral involvement is worser than that for unilateral involvement. PORT – PSI scoring and Classification of cases, early hospitalization in Class IV and V, arterial oxygenation assessment in the first 24 hours, blood culture collection in the first 24 h prior to another investigation, early antibiotic and antiviral administration within 4-6 hours, empirical antibiotic treatment as per guidelines (IDSA /ATS) and pneumococcal & Influenza vaccination prevented worse outcome in bilateral pneumonitis patients.

Acknowledgements

Authors would like to acknowledge all the subjects participated in the study. Everyone who contributed in the completion of the study including the technical staff

Declarations

Funding: No funding Sources

Conflict of Interest: None Declared

Reference

1. "Pneumonitis - Symptoms and causes". mayoclinic.com:1-2
2. Heo JY, Seo YB, Choi WS, Lee J, Yoon JG, Lee SN, et al. Incidence and case fatality rates of community-acquired pneumonia and pneumococcal diseases among Korean adults: Catchment population-based analysis. PloS One. 2018;13(3):e0194598.
3. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet Lond Engl. 2012 Dec 15;380(9859):2095–128.
4. Torres A, Peetermans WE, Viegi G, Blasi F. Risk factors for community-acquired pneumonia in adults in Europe: a literature review. Thorax. 2013 Nov1;68(11):1057–65.
5. Niederman MS, Mandell LA, Anzueto A, Bass JB, Broughton WA, Campbell GD, et al. Guidelines for the management of adults with community-acquired pneumonia. Diagnosis, assessment of severity, antimicrobial therapy, and prevention. Am J RespirCrit Care Med. 2001Jun;163(7):1730–54.
6. Fine MJ, Auble TE, Yealy DM, Hanusa BH, Weissfeld LA, Singer DE, et al. A prediction rule to identify low-risk patients with community-acquired pneumonia. N Engl J Med. 1997 Jan 23;336(4):243–50.
7. Prina E, Ranzani OT, Torres A. Community-acquired pneumonia. Lancet Lond Engl. 2015 Sep 12;386(9998):1097–108.
8. Mahendra M, Jayaraj BS, Limaye S, Chaya SK, Dhar R, Mahesh PA. Factors influencing severity of community-acquired pneumonia. Lung India. 2018 Jul1;35(4):284.
9. Kumar TN, Rafiudeen R, Rashmi K. A study of clinical and etiological profile of community-acquired pneumonia with

special reference to atypical pneumonia. Ann Niger Med. 2017 Jan 1;11(1):11.
10. Quero BG, Fernandez LS, Moyano MG, Garrido IS, Bonilla AG, Crespo BG, et al. Differences in community acquired pneumonia according to gender. EurRespir J [Internet]. 2017 Sep 1.
11. Shah BA, Singh G, Naik MA, Dhobi GN. Bacteriological and clinical profile of Community acquired pneumonia in hospitalized patients. Lung India. 2010 Apr1;27(2):54.
12. Bansal S, Kashyap S, Pal LS, Goel A. Clinical and Bacteriological Profile of Community Acquired Pneumonia in Shimla, Himachal Pradesh. Indian J Chest Dis.46:6.
13. Almirall J, Bolíbar I, Balanzó X, González CA. Risk factors for community-acquired pneumonia in adults: a population-based case- control study. EurRespir J. 1999Feb;13(2):349–55.
14. Jain SK, Jain S, Trikha S. Hospitalized Patients of Gajra Raja Medical College, Gwalior, Central India.2014;2(6):5.
15. Khawaja A, Zubairi ABS, Durrani FK, Zafar A. Etiology and outcome of severe community acquired pneumonia in immunocompetent adults. BMC Infect Dis. 2013 Feb20;13(1):94.
16. Marcos PJ, Restrepo MI, González-Barcala FJ, Soni NJ, Vidal I, Sanjuàn P, et al. Discordance of physician clinical judgment vs . pneumonia severity index (PSI) score to admit patients with low risk community-acquired pneumonia: a prospective multicenter study. J Thorac Dis. 2017 Jul6;9(6):1538-1546–1546.
17. Mac Farlance J. Community acquired pneumonia. Br J Dis Chest 1987; 81 :116-27.
18. Ortqvist A, Hedlund J, Grillner L, et al. Aetiology outcome and prognostic factors in community acquired pneumonia requiring hospitaliztion. Eur Respir J 1990; 3 :1105-13.
19. Pachon J, Prados MD, Capote F, Cuello JA, Garnacho J, Verano A. Severe Community acquired pneumonia : Etiology, prognosis and treatment. Am Rev Respir Dis 1990; 142 :369-73.
20. Dey AB, Nagarkar KM, Kumar V. Clinical presentation andpredictors of outcome in adult patients with community-acquired pneumonia. Natl Med J India 1997; 10 :169-72.