Evaluation of In-Hospital Management of Pneumonia Patients

Daniyal Nagi , Asad Ali,Hafiz Mudabbar Mahboob, Mamoona Ghias , Saif-ur-Rehman , Hira Kareem

Department of Medicine Mayo Hospital Lahore and King Edward Medical University, Lahore

Abstract

Background: **To audit the practices involved in management of pneumonia patients in our settings and to compare them with standard recommended guidelines by British Thoracic Society (BTS).**

Methods: **In this cross sectional study inclusion criteria was all patients admitted with suspicion of lower respiratory infection/pneumonia, with no exclusion. Clinical presentation , diagnostic workup, treatment modalities and complications were analyzed.**

Results: **Majority (97.3%) of the patients were admitted through emergency. Length of stay was less than 1 week in 72%. CURB-65 was applied in 2.6%. Majority (96%) patients had inadequate investigations. Most commonly prescribed first line antibiotic was Cephalosporins given to 56%.. Co-morbidities were registered in 96%, which contributed towards expiry rate of 60%.**

Conclusion: **The management of pneumonia patients in our settings is not in line to the recommended standard guidelines . This results in increased complications, prolonged hospital stay and an overall poor prognosis.**

Key Words: Pneumonia, Community acquired, Streptocaus pnuemiae

Introduction

Pneumonia is the infection of lower respiratory tract and constitutes a major fraction of patients admitted in hospitals. [1] This infectious disease is one of the common reason of morbidity and mortality in both developed and developing countries.[2-4] In Pakistan situation is quite alarming. The range of overall annual incidence of community acquired pneumonia (CAP) in adults in Europe existed between 1.07 to 1.2 per 1000 person –years and 1.54 to 1.7 per 1000 population. With age, the incidence of CAP increased (14 per 1000 person-years in adults aged greater than 65). More men were affected than women and patients with chronic respiratory disease or HIV infection had higher occurrence. [5]

Community acquired pneumonia and nosocomial pneumonia are the two types of pneumonia. Most common causative organisms are S. pneumoniae, Haemophilus influenzae, Aerobic gram negative rods and S. aureus. The symptoms of CAP are fever and chills, cough, rapid breathing or difficulty breathing. The most common causative organism according to a literature review of 41 European studies is Streptococcus pneumoniae followed by Mycoplasma pneumoniae, Chlamydophila pneumoniae, Legionella pneumophila and Haemophilus influenzae but in Asia situation is quite different. [6] Most common causative organism is Streptococcus pneumonia 13.3%, followed by gram negative bacteria (only Enterobacteriaceae) 9.0%, mycoplasma pneumonia 8.3%, Chlamydophila pneumoniae 6.9%, Staphylococcus aureus 4.0%, Haemophilus influenzae6.9%, Legionella species 3.0%.[7]

Complications vary from life threatening comprises to massive pleural effusion, hypotension, lung abscess, lung cavitation, sepsis with shock, and acute respiratory failure ,often requiring admissions in high dependency units. [8-10] Other complications which are hardly of any clinical consequences include mild confusion, mild jaundice, haemoptysis, mild anaemia, and arthritis.[8-11] To determine the rate of mortality in patients with low risk factors, pneumonia severity index is applied. The range of mortality existed from 0.1 to 0.4 percent for class I patients , from 0.6 to 0.7 percent for class II , and from 0.9 to 2.8 percent for class III. [12,13]

Pneumonia is defined as acute lung parenchymal infection caused by single or multi infectious pathogens excluding the bronchiolitis condition, the causative organism of bronchiolitis is always viral. [13] CAP is defined as acute lung parenchymal infection caused by single or multi infectious pathogens associated with its signs and symptoms with chest radiographs showing acute infiltrate in patient who has no history of hospital stay for last 14 days.[14,15]

Patients and Methods

This cross sectional study was conducted in South Medical Department of Mayo Hospital Lahore , from

November 2017 to January, 2018. Using the confidence level of 95% and precision of 5% with prevalence of stroke in Pakistan being 4.8%, sample size calculated was 70.Inclusion criteria was all patients admitted in Mayo hospital with suspicion of lower respiratory infection/pneumonia, with no exclusion. Clinical presentation, diagnostic workup, treatment modalities and complications were analyzed. All collected data was entered and analysed by SPSS 21.

Results

Shortness of breath (85.33%) and cough (76.0%) were the commonest complaints (Table 1). Hypertension (74.6) and Diabetes Mellitus (70.6%) were more prevalent co-morbidities (Table 2). Majority (97.0%) were admitted through emergency room. Forty percent were shifted to ICU. Forty five (60%) expired (Table 3). Chest X-ray was most frequently done investigation(93.3%) and ABGs were done in (86.6%).

Table 1: Pneumonia- Presenting complaints

Presenting complaint	No(%)
Shortness of breath	64(85.3)
Cough	57(76)
Fever	34(45.3)
Expectoration	42(56)
Hemoptysis	6 (8)
Others	37(49.3)

Table 2.Pneumonia-Co-morbidities

Co-morbidities	No(%)
Hypertension	56(74.6)
Diabetes Mellitus	53(70.6)
Chronic Obstructive Lung Disease	27(36)
Tuberculosis	16(21.3)
Asthma	11(14.6)
Others	41(54.6)

Table 3. Pneumonia- mode of admission, hospital stay and outcome

Parameter		No (%)
Mode of admission	Out Patient Department	2(2.66)
	Emergency	73(97.33)
Length of stay	< 1week	54(72)
	> week	21(28)
ICU admission	Required	30(400
	Not required	45(60)
Outcome	Discharged	30(40)
	Expired	45(60)

Table 4. Pneumonia –Investigation implicated in the management

	Frequency	Percentage
Chest X-ray	70	93.3
ABGs	65	86.66
CT Scan	15	20
ESR/CRP	7	9.3
Sputum C/S	24	32
Blood C/S	4	5.3
CURB-65	2	2.6
Vaccination	4	5.3

Table 5. Pneumonia- Antibiotics employed

		Frequency of patients			
		1st line antibiotic	2nd line antibiotic	3rd line antibiotic	4th line antibiotic
Group of Antibiotics	Cephlosporins	42	6	-	-
	Quinolones	11	32	6	2
	Cephlosporins and quinolones	17	-	-	-
	Macrolides	-	2	9	-
	Penicillin derivatives	4	4	-	6
	Others	1	11	5	6
	None	-	20	55	67

Table 6. Pneumonia – complications

Complication	Frequency	Percentage
ARDS	21	28.0
Atrial fibrillation	3	4.0
Sepsis	14	18.7
ARDS and Sepsis	8	10.7
A.fib and Sepsis	1	1.3
None	28	37.3
Total	75	100

Blood culture, sputum culture, CT scan, ESR and vaccination were included in the management of very little number of patients. CURB-65 was applied in only 2 patients (2.6%) (Table 4).Most commonly prescribed first line antibiotic was Cephalosporins alone in 56% (Table 5). Most common complication was ARDS (28%), next common being the sepsis (18.6%) (Table 6).

Discussion

Pneumonia is 4th most common cause of mortality according to global burden of disease study conducted in 2010 [2]. According to a survey, about one million people expire with community acquired pneumonia in Asia annually. Most of the people who die due to CAP belong to older age group i.e. above 60 years but people having age between 15-59 years with good life expectancy contribute a large fraction as well. [16]. According to British Thoracic Society (BTS) CURB-65 scoring system.[17] Patients with community acquired pneumonia were classified into low, intermediate, and high risk groups. So, patients should be treated according to BTS protocol. [18- 20] It is observed that risk of community acquired pneumonia is increased by many folds if the patient has other chronic illness like COPD, cardiovascular diseases, cerebrovascular disease, Parkinson's disease, hypothermia,malignancy, dysphagia, HIV or chronic renal or liver disease. [5,21,22]

The purpose of this audit was to identify the deficiency in diagnosis and management of pneumonia in addition to the evaluations of risk factors, way of presentation, gender distribution and the final outcome.The local practises involved were compared with the International Standardized guidelines.After evaluating the results, we have identified deficiencies in the investigations carried out and the type of antibiotics used. It was observed that patients with advanced age and co-morbidities had high mortality and prolonged hospital stay. Apart from Chest X Rays and ABGs rest of the investigations protocol were not carried out fully as recommended. CURB 65 scoring was done only in 2 patients. Despite people being admitted to HDU/ICU,blood and sputum cultures were done only in few patients.

Broad spectrum antibiotics use, abuse and misuse for CAP like common infection is very dangerous particularly in Asia where mortality rate is high, there is shortage of resources and resistance to antibiotics.[23,24] In these patients choice of antibiotics is not usually followed as par the recommendations. Hospital follow up was advised only to 30% of patients. The overall effect of these factors is increase in mortality.It is also noticed that presence of co-morbidities and advanced age is also a significant risk factor towards a high mortality rate.

The reason for these deficiencies as described above is multifactorial and reflects poorly on the quality of service delivered in a tertiary care hospital. The major reason for this is the lack of standardization of hospital protocols,gaps in the knowledge of junior doctors,inadequate supervision and guidance, delay on the part of patient and families in seeking medical advice and lastly excessive work load on junior doctors in Emergency Department

It is therefore recommended that junior doctors involved in managing these patients need to update their knowledge and refresh their skills. Input from senior consultants should be sought at a much earlier stage. An investigation protocol for all pneumonia patients should be in place and strictly adhered to. Initial evaluation using CURB 65 Score should be made mandatory in all patients above 65, which will help in identifying patients with advanced disease and needing High Dependency Care at an earlier stage.The guidelines should be regularly updated keeping in view the availability of new drugs and also presence of drug resistant strains

Conclusion

The management of pneumonia patients in our settings is not in line to the recommended standard guidelines . This results in increased complications, prolonged hospital stay and an overall poor prognosis.

References

1. Hippocrates. Translated from the Greek with a preliminary discourse and annotations by Francis Adams. London: Sydenham Society; 1849. The genuine works of Hippocrates, 1:324
2. Lozano R, Naghavi M, Foreman K. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010. Lancet 2013;380:2095–128.
3. Egbagbe EE, Mordi RM. Aetiology of respiratory tract infections in Benin City. J Med Biomed Res.2006;5:22–27.
4. Nwosu CM, Anisuba BC. A hospital study of adults with CAP 11-clinical course and complications.Orient J Med. 1991;3:196–99.
5. Ttorres A, Peetermans E W, ViegiG,Blasi F. Risk factors for community-acquired pneumonia in adults in Europe: a literature review.Thorax. 2013 Nov; 68(11):1057-65
6. Woodhead M. Community-acquired pneumonia in Europe: causative pathogens and resistance patterns. Eur Respir J Suppl 2002;36:20s–27s.
7. Peto L, Nadjm B, Horby P, Ngan TD, Doorn RV.Bacterial aetiology of adult community-acquired pneumonia in Asia: a systematic review. Trans R Soc Trop Med Hyg. 2014 ; 108(6): 326–37.
8. Nwosu CM, Anisuba BC. A hospital study of adults with CAP 11-clinical course and complications. Orient J Med. 1991;3:196–99.
9. Sofowora EO, Onadeko BO. Complications and prognostic factors in pneumonia among Nigerians. Niger Med J. 1973;3:144–45.
10. Cunha BA. Severe community-acquired pneumonia. Crit Care Clin. 1998;14:105–18
11. Rello J, Rodriguez A, Torres A, Roig J, Sole-Violan J. Implications of COPD in patients admitted to the intensive care unit by community-acquired pneumonia. EurRespir J.2006;27:1210–16

12. Fine MJ, Auble TE, Yealy DM. A prediction rule to identify low-risk patients with community-acquired pneumonia. *N Engl J Med.* 1997; 336:243-50.
13. Mackenzie G.The definition and classification of pneumonia. Pneumonia (Nathan). 2016;v 8: 14-17.
14. Johnson PD, Irving LB, Turnidge JD. 3: Community-acquired pneumonia. Med J Aust. 2002;176:341–47.
15. 15)Jennings LC, Anderson TP, Beynon KA, Chua A, Laing RT, Werno AM. Incidence and characteristics of viral community-acquired pneumonia in adults. Thorax. 2008;63:42–48
16. World Health Organization. Global burden of disease (GBD). Geneva:World Health Organization;2008.http://www.who.int/healthinfo/global_ burden_disease/gbd/en/[accessed 1 August 2012].
17. Lim WS, Eerden van der MM, Laing R, Boersma WG, Karalus N. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax. 2003;58(5):377–82.
18. BTS Standard of Care Committee. BTS Guide lines for management of CAP in adults. Thorax.2001;56:iv 1–64.
19. Lim WS1, Baudouin SV, George RC, Hill AT, Jamieson C. BTS guidelines for the management of community acquired pneumonia in adults 2009;64(3): 901-05
20. Capelastegui A, España PP, Quintana JM, Areitio I, Gorordo I. Validation of a predictive rule for the management of community-acquired pneumonia. EurRespir J. 2006;27:151–57.
21. Ito A, Ishida T, Tokumasu H, Washio Y, Yamazaki A, Ito Y.Prognostic factors in hospitalized community-acquired pneumonia: a retrospective study of a prospective observational cohort. BMC Pulm Med. 2017;17(1):78-81.
22. Restrepo MI, Mortensen EM, Pugh JA, Anzueto A. COPD is associated with increased mortality in patients with community-acquired pneumonia. Eur Respir J. 2006;28(2):346–51.
23. Kumarasamy KK, Toleman MA, Walsh TR. Emergence of a new antibiotic resistance mechanism in India, Pakistan, and the UK: a molecular, biological, and epidemiological study. Lancet Infect Dis 2010;10:597–602.
24. Jean SS, Hsueh PR. High burden of antimicrobial resistance in Asia. Int J Antimicrob Agents 2011;37:291–95.