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Study of Clinical Presentations and Treatment Outcome of Severe Community Acquired Pneumonia in the Department Of Pulmonology of a Tertiary Care Hospital

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Abstract: *Clinical profile of 50 patients with severe community acquired pneumonia (SCAP) admitted in ICU and pulmonology ward of Government general hospital, Anantapur, Andhra Pradesh was studied with special reference to demographic variables, symptomatology, etiology, management, and treatment outcome. The purpose of this prospective observational study is to evaluate clinical profile and treatment outcome of SCAP and to understand bacteriological causes, sensitivity patterns, treatment response, complications and clinical outcome of study population.*
Keywords: *severe community acquired pneumonia, treatment outcome.*

I. Introduction

Community acquired pneumonia (CAP) requiring hospitalization have poor outcomes including death. Up to 16% of patients, who have CAP, require admission to ICU [1]. Notwithstanding advances in antimicrobial therapy and supportive measures, the mortality in CAP patients admitted to ICU ranges from 21 to 58% [2].

In 1993, ATS defined a proportion of CAP as "severe" defined as a subset of CAP patients who have severe diseases, who prone to have complications and poor outcomes, and who require higher level of care [3]. In 2007, IDSA/ATS clinical practice guidelines revised the criteria for ICU admission [4]. Severe CAP (SCAP) patients need admission to hospital, involvement of an experienced clinician in their care, if required, early admission to ICU and the use of broad spectrum empirical antibiotics [5]. Cases of SCAP admitted to ICU with comorbidities have poor outcomes [6]. In addition, patients who have severe CAP tend to stay longer in the hospital which is associated with higher hospital cost [7]. The most important risk factors associated with admission to the ICU are patients with CAP and comorbid conditions. Advanced age has been associated with risk of acquiring severe CAP [8]. It is important to highlight the recent evidence associated with certain comorbid conditions like COPD, alcohol abuse, renal failure, heart disease, diabetes mellitus, malignancy, chronic neurologic disease, and chronic liver disease [9].

II. Aims & objectives

To evaluate the clinical profile and treatment outcome of severe CAP.

III. Material & methods

This is a prospective observational study of patients admitted into multispecialty intensive care unit and pulmonary ward of the medical college attached hospital in Anantapur, Andhra Pradesh from November 2013 to April 2015 (18 months).Consecutive patients of both sexes above 18 years age with diagnosis of SCAP were included. Initially all patients were admitted into ICU. Exclusion criteria included where there is no informed consent and patients who are discharged from hospital within 14 days of hospital admission. A total of 50 patients who fulfilled criteria of SCAP were enrolled into study [4]. Patients were divided into 2 groups Group A includes SCAP patients with comorbidity. Group B includes SCAP patients without comorbidity.

All patients admitted to ICU were subjected to routine urine and blood examination, blood glucose, renal function tests, liver function tests and ET secretions sent for pathogenic bacteria, mycobacteria and fungi. Blood cultures were done for pathogenic bacteria in all cases. Antibiotic susceptibility was tested using disc diffusion technique [10]. Arterial blood gas (ABG) analysis and supine chest x ray were done in all cases. Other tests included CT of chest, flexible bronchoscopy were done in selected cases. Mechanical ventilation, inotropic support and other supportive ICU care was given as required by the patient. Empirical antibiotic therapy started pending reports. Weaning done as per preexisting guidelines [11]. Once weaned off from ventilator, patient shifted to ward and further treatment continued. Once discharged, patients have been followed every month for 3 months and later with respiratory symptoms. Outcome is determined as those improved, not improved, and death.

IV. Statistics

This data was entered in excel spread sheet and analyzed using SPSS software. The data was summarized as percentages and the differences between various groups were tested for significance using chi square test and student t-test. A p value of < 0.05 is taken as significant.

V. Results

1) The details of subjects included in study are shown in table 1.

Table 1 showing demographic details of patients.

AGE (YEARS)	GROUP A			GROUP B			TOTAL
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	
18-30	0	1	1	4	7	11	12
31-45	2	1	3	1	4	5	8
46-60	8	4	12	0	2	2	14
61-75	7	3	10	2	0	2	14
>75	2	1	3	0	1	1	4
TOTAL	19	10	29	7	14	21	50

2) In group A, the most frequent coexisting illness was COPD (10 of 29 cases) followed by Diabetes mellitus (8 of 29 cases). The details are shown in table 2.

Table 2 showing comorbidities of patients.

DISEASE	No. OF CASES
. COPD	10 (20%)
DM	8 (16%)
CHF	3 (6%)
HTN	3 (6%)
CKD	2 (4%)
HIV	2 (4%)
CLD	1 (2%)
TOTAL	29 (58%)

3) Details of presenting symptoms are shown in table 3.

SYMPTOM	GROUP A (n=29)	GROUP B (n=21)	TOTAL	P* VALUE
COUGH	29 (100%)	21 (100%)	50 (100%)	-
FEVER	27 (93.1%)	20 (95.2%)	47 (94%)	0.75
BREATHLESSNESS	27 (93.1%)	20 (95.2%)	47 (94%)	0.75
SPUTUM	21 (72.4%)	14 (66.7%)	35 (70%)	0.66
CHEST PAIN	4 (36.4%)	7 (63.6%)	11 (100%)	0.10

* Chi Square Test

4) Microbiological diagnosis was done in 58% cases (75.9% in group A and 33.3% in group B). Sputum samples collected in 3 patients and endotracheal aspirations done in 47 patients. The details of smears and isolated bacteria from culture are shown in table – 4, 5.

Table 4 showing details of smear examination (gram staining)

GRAM STAINING	GROUP A	GROUP B	TOTAL
GRAM POSITIVE ORGANISMS	8 (27.6%)	4 (19.0%)	12 (24%)
GRAM NEGATIVE ORGANISMS	10 (34.5%)	3 (23.1%)	13 (26%)
MIXED ORGANISMS	4 (13.8%)	1 (4.8%)	5 (10%)
NO BACTERIAE	7 (24.1%)	13 (61.9%)	20 (40%)
TOTAL	29	21	50

Table 5 showing details of pathogenic bacteria isolated

ORGANISM	GROUP A	GROUP B	TOTAL	DEATH PATIENTS (n=19)
STERILE	7 (24.1%)	14 (66.7%)	21 (42%)	7 (36.8%)
KLEBSIELLA	9 (31%)	3 (14.3%)	12 (24%)	5 (26.3%)
STREPTOCOCCUS	7 (24.1%)	3 (14.3%)	10 (20%)	2 (10.5%)
ENTEROBACTER	2 (6.9%)	0 (0%)	2 (4%)	1 (5.3%)
E.COLI	1 (3.4%)	1 (4.8%)	2 (4%)	2 (10.5%)
PSEUDOMONAS AERUGINOSA	2 (6.9%)	0 (0%)	2 (4%)	2 (10.5%)
STAPHYLOCOCCUS AUREUS	1 (3.4%)	0 (0%)	1 (2%)	0 (0%)
TOTAL	29	21	50	19

5) The results blood cultures are shown in table 6.

GROWTH OF PATHOGENIC BACTERIA	GROUP A	GROUP B	TOTAL
STERILE	27 (93.1%)	18 (85.7%)	45 (90%)
STREPTOCOCCUS	1 (3.4%)	1 (4.8%)	2 (4%)
KLEBSIELLA	0 (0%)	1 (4.8%)	1 (2%)
E.COLI	0 (0%)	1 (4.8%)	1 (2%)
ENTEROCOCCUS	1 (3.4%)	0 (0%)	1 (2%)
TOTAL	29 (100%)	21 (100%)	50 (100%)

6) The initial empirical treatment received after admission to hospital was combination of antibiotics. The most common combination antibiotic used in group A is piperacillin/tazobactum and levofloxacin 41.37% and in group B, it was amoxicillin/clavulinate and clarithromycin 23.8%. The initial treatment was changed in 30% (31.03% in group A and 28.57% in group B) due to poor response.
7) Mechanical ventilation was necessary in 94% (93.1% in group A and 28.6% in group B). Inotropic support was given in 42% (51.7% in group A and 28.6% in group B).
8) Complications developed during hospital stay are shown in table 7.

COMPLICATION	GROUP A	GROUP B	TOTAL
SEPSIS	9 (31%)	4 (19%)	13 (26%)
NOSOCOMIAL PNEUMONIA	3 (10.3%)	1 (4.7%)	4 (8%)
EMPYEMA	1 (3.4%)	2 (9.5%)	3 (6%)
ARDS	0 (0%)	2 (9.5%)	2 (4%)
LUNG ABSCESS	1 (3.4%)	0 (0%)	1 (2%)
TOTAL	29 (100%)	21 (100%)	50 (100%)

9) The mean duration of admission to death in ICU in group A is 7.1 days and group B is 6.8 days.
10) Cases in group A on average stay 4 days longer than group B.
11) The details of treatment outcome are shown in table 8.

OUTCOME	GROUP A	GROUP B	TOTAL	P*VALUE,SIG
IMPROVED	10 (34.5%)	14 (66.7%)	24 (48%)	0.025 S
NOT IMPROVED	5 (17.2%)	2 (9.5%)	7 (14%)	0.463 NS
DEATH	14 (48.3%)	5 (23.8%)	19 (38%)	0.079 S
TOTAL	29	21	50	

*Chi Square Test

VI. Discussion

SCAP is a life threatening condition that requires intensive care. The exact incidence of SCAP is unclear. Only few studies are available on SCAP with regard to epidemiological, diagnostic and prognostic aspects. In our country studies on SCAP have not been done separately but there were some cases of SCAP in the previous studies done on CAP.

In the present study, causative organism was isolated in 58% of cases. The diagnostic yield is low when compared to the French study (78%) [12]. This low yield may be due to non-availability of viral and anaerobic cultures. Flexible bronchoscopy was also not possible in all patients. All these factors could have contributed to lower diagnostic yield in our study.The most common organism isolated was Klebsiella pneumoniaefollowed by Streptococcus pneumoniae in both groups. Madhu SV et al and Sharma TN et alshowed higher prevalence of Klebsiella pneumoniae among culture positive patients during the last two decades in India [13][14].

In present study, blood culture was positive in 10% (6.9& in group A and 14.3% in group B). This figure is low when compared to Paganin F et al (33%). Poor diagnostic yield (2 0f 12 acinetobacter and 1 of 12 pseudomonas) of bronchial washings in present study could be due to early administration of empirical antibiotics.In present study, mechanical ventilation was necessary in 94% (93.1% in group A and 28.6% in group B). Inotropic support was given in 42% (51.7% in group A and 28.6% in group B). These rates are higher compared to study done by Marrie et al (81% need mechanical ventilation).

The most frequent complication recorded in present study was sepsis in 38% cases (31% in group A and 19% in group B). Sepsis was cause of death in 57% cases in our study. Previous studies by Yoshimoto et al, Dremsizov T et al admit that septic shock was associated with higher mortality and is frequent complication [15][16]. In present study, the hospital stay was longer for patients in group A compared to group B. M.I.Restrepo et al found patients with COPD significantly higher rates of ICU admission and length of hospital stay compared those without COPD [17].

Main limitations to our study were failure to do cultures for anaerobes and viral organisms, serological tests for atypical bacteria and viruses.

VII. Conclusion

SCAP occurs more frequently in those with comorbidities. COPD is the most frequent concomitant illness in SCAP. ICU stay is longer in individuals with comorbidities than in those without any comorbid condition. Treatment outcome is better in those cases of SCAP without any comorbid illness. The most frequent causative organism of SCAP isolated is Klebsiella pneumoniae followed by Streptococcus pneumoniae. Treatment failure was observed in 30% patients and in 56.3% with comorbidities. The most frequent complication is sepsis. The overall mortality in SCAP is higher in patients with comorbidities.

To conclude, SCAP is associated with significant mortality; early recognition and prompt treatment with effective combination treatment may improve outcome better in those without comorbidity.

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