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Descriptive Study of Clinical Profile and Outcome in Case of Acute Respiratory Distress Syndrome in Tertiary Care Hospital

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Abstract: ***Acute respiratory distress syndrome (ARDS) is clinical syndrome of severe dyspnea of acute onset, hypoxemia and diffuse pulmonary infiltrates causing respiratory failure. This syndrome can occur even without primary damage to lung parenchyma and thus they are more often classified as ARDS due to pulmonary and extrapulmonary causes. The diagnosis of ARDS depends on clinical criteria alone because it is not practical to obtain direct measurements of lung injury by pathological samples of lung tissue in most patients; furthermore, neither distal airspace nor blood samples can be used to diagnose ARDS. Hence our Objective was to study the clinical profile and outcome of patients with ARDS coming to our tertiary care hospital.***

Keywords: ARDS (Acute respiratory distress syndrome), Hypoxemia, Respiratory failure, lung injury.

1. Introduction

Acute respiratory distress syndrome (ARDS) is clinical syndrome of severe dyspnea of acute onset, hypoxemia and diffuse pulmonary infiltrates causing respiratory failure. The acute respiratory distress syndrome (ARDS) was previously defined in 1967 with a case-based report that described the clinical presentation in critically ill adults and children of acute hypoxaemia, noncardiogenic pulmonary oedema, reduced lung compliance, increased work of breathing and the need for positive pressure ventilation in association with several clinical disorders including trauma, pneumonia, sepsis and aspiration[1]. In 1992, an American–European consensus conference established specific diagnostic criteria for the syndrome[2] ; these criteria were updated in 2012 in the so-called Berlin definition of ARDS in adults.The criterion used for diagnosis is based on the American/European consensus statement for definition of ARDS. 1) Sudden onset breathlessness within 7 days 2) Bilateral infiltrates on X-ray 3) Absence of clinical signs of left atrial hypertension, left heart failure 4) PaO2/FiO2≤ 200 mmHg. There are few studies on the pattern of ARDS seen in our country. Much of the available data on the clinical course of patients with ARDS are from western literature. This Descriptive study will attempt to evaluate the Clinical profile and outcome of ARDS patients admitted to our tertiary care hospital.

2. Aims and Objectives

The primary aim of the study was to study the clinical outcome in patients of acute respiratory distress syndrome with secondary objectives to determine the possible causes and clinical features in acute respiratory distress syndrome patients and to correlate the outcome in patients of acute respiratory distress syndrome.

3. Materials and Methods

This study is a prospective observational study conducted at a tertiary care center with approval from the Ethics Committee. The data of 117 patients who were admitted in tertiary care center from July 2020 to Jan 2021 who had symptoms suggestive of ARDS who were fitting in the inclusion criteria and gave informed written consent to participate in the study either by the patient himself or the relative of the patient were included in the study. History was noted about the onset of symptoms and its progression over time and clinical examination done in detail including the detailed respiratory system. Investigations like Arterial blood gas analysis, liver function test, renal function test, complete hemogram, electrocardiograph were done and patients were managed in ICU setting with standard protocol as per patient's condition and investigation reports. The arterial blood gas analysis was done at the time of admission. Patient was then followed up until death occurred or was discharged from hospital. Before discharge any morbidity or complication were noted. All the data was recorded and compiled for the study and then the data was analyzed.

Study Design
It's a prospective observational study.

Place of Study
Department of General Medicine, tertiary care center.

Duration of Study:
1 Year 6 months

Sample Size: Sample size included -117 patients who were admitted in tertiary care hospital with ARDS symptoms and managed in our hospital from July 2020 to Jan 2021.

Inclusion Criteria:

1) Acute onset of dyspnea within 7 days
2) Bilateral infiltrates on chest x-ray
3) Absence of clinical signs of left atrial hypertension, left heart failure
4) PaO2/FiO2≤ 200 mmHg
5) Age >18yrs

Exclusion Criteria:

1) Age <18 yrs
2) Significant underlying lung disorder
3) Those discharge against medical advice
4) Clinical or investigative procedures suggestive of left sided cardiac dysfunction

Statistical Analysis

Data analysis was done by using IBM SPSS software. Chi square test was used for comparative analysis. Following other statistical methods have been employed in the present study: Independent samples 't' test – unpaired. Microsoft Word and Microsoft Excel have been used to generate graphs, tables etc. Data was included in pre-structured, protected spreadsheets in Microsoft Excel.

Ethical Consideration

The protocol was reviewed and approved by the Ethics Committee for Academic Research Projects, Postgraduate Academic Committee. Informed consent was obtained from all the patients. The researcher did not record the patient's name for the purpose of data collection. No external funding was used for this analysis.

4. Observation and Results

Table No 1 shows age wise distribution of study patients. Mean ± std. 50.94 ± 18.43 yrs. range 19 – 80 yrs. Table No 1 shows age wise distribution of study patients, maximum patients belonged to 31-50 years of age-that is 36 patients.

Table 1

S. No	Age(yrs)	Frequency	Percentages
1	>18-30	25	21.36
2	31-50	36	30.76
3	51-70	29	24.78
4	>71	27	23.07
Total		117	100

Table No. 2 shows gender wise distribution of study patients, majority of study patients 69 (58.97%) cases were male while females were 48(41.02%).

Table 2

S. No	Sex	Frequency	Percentage
1	Male	69	58.974
2	Female	48	41.025

Table No. 3 shows the various etiology of study patients of ards, pneumonia was found in 61 (52.13%) of cases while sepsis with ARDS was found in 39 (33.33%) cases.

Table 3

S. No	Etiology	Frequency	Percentage
1	Lobar Pneumonia	61	52.13
2	Sepsis	39	33.33
3	Covid 19 Pneumonia	13	11.11
4	Aspiration Pneumonia	4	3.41

Distribution of study patients according to past history, diabetes was found in 27 (23.07%) of cases followed by hypertension in 23 (19.65%) cases, IHD 19(16.23), HIV 2(1.70). Personal history of 25 (21.36%) of cases had smoking habits while alcohol consumption was present in 16 (13.67%) of cases.

The symptoms at the time of presentation, the majority of cases 94 (80.34%) showed breathlessness followed by fever in 74 (63.24%), while cough cases were present in 51 (43.58%) of cases.

Distribution of study patients according to signs at the time of presentation, majority of cases 88 (75.213%) of cases had normal pulse rate (61- 100 BPM), majority of cases 57 (48.71%) of cases had normal SBP (90-120) while majority of cases 37 (31.62%) of cases had low DBP (51-60 MMHG) oxygen saturation was low (61-80) was found is nearly 63 (53.84%) of cases.

Blood investigations, majority of cases 54 (46.15%) had HB in the range of 10-12 gm %, majority of cases 69 (58.97%) of cases have TLC more than 10,000. Majority of cases 80 (68.37%) had normal platelet count, 66 (56.41%) of cases had normal creatinine value. Majority of cases 110 (94.01%) had normal RBS, 111(94.87%) of cases had Albumin level less than 3.4. Majority of cases had normal bilirubin level 104 (88.88%). Finding of Arterial Blood Gas analysis showed majority of cases 74 (63.24%) had PH less than 7.35, while majority of cases 62 (52.99%) had HCO3 level in between 18-24pco2 level of majority of patients was less than 35 mm hg of 65 patients (55.55%). Majority of cases 54 (46.15%) had Po2 levels in between 41-60 mm hg.

In the distribution of study patients according to the number of stay in hospital, Majority of cases 62(52.99%) were admitted for 6-10 days in hospital.

In the outcome of patients, 74 (63.24%) died. Relatively more deaths were observed in sepsis with ARDS ,male population. Patients with a past history of DM(15 deaths) and HTN(14 deaths) had maximum mortality. The patients who had breathlessness as a symptom had more mortality(61 deaths) than fever(46 deaths) and cough (22 deaths).

Low oxygen saturation had significant importance in determining outcome of cases spo2 < 70 % had 42 deaths. Presence of anemia had importance in determining outcome of cases Hb < 12 had 52 deaths. Hypoalbuminemia is associated with slightly increased 70 deaths (58.57%) mortality than the normal albumin range patients. Low oxygen saturation Po2< 60 had mortality of 45 cases. Also low pH and low bicarbonate was associated with increased mortality.

5. Discussion

A total of 117 patients that met the AECC definition of ALI/ARDS of whom consent was obtained from relatives were included in this study. Since its first description the acute respiratory distress syndrome has been acknowledged to be a major clinical problem in respiratory medicine. About 69 patients among the 117 patients included in the study were males which accounted for about 58.97 % of all study subjects, the rest 48 patients in this study were females. In the study conducted by Dr. Savitha Sebastian[3] in the year 2012 also comprised 52 % of males. Thus males comprise slightly more than females in both the studies. Despite the increased incidence in ARDS, the mortality in patients with ARDS does not differ according to gender. The Mahandra M et al[4] study had 51% males which is very close to our study. In the Sapkal Harish Barsu[5] study males were 57.14%. The mean age of the patients enrolled in our study was 50.94 years with standard deviation of 18.43 years. And the maximum number of cases were from the age group 30-40 years which comprised 36 patients of 117 patients. In the Sapkal Harish Barsu[5] study also the maximum number of cases were from the age group of 30-40 years. There was no statistically significant increase in mortality seen with increasing age in this study although a significant association between age and mortality has been shown in several studies. In a study conducted in North India by Agarwal et al[6], it was observed that when patients aged more than 50 years were compared to younger patients, the outcome was not significantly different. In the Sapkal Harish Barsu[5] study conducted in GMC Nagpur maximum mortality was seen in middle aged people. In this study also the maximum mortality that is 37 out of 74 deaths was seen in age 30-60 years of age . Pulmonary Infection that is pneumonia (52.13%) followed closely by Sepsis (33.33%) accounted for most common causes for ARDS in this study. A study conducted by Vigg et al[7] in Hyderabad had made similar observations with Primary pulmonary infection being the most common cause of ARDS. In the Savitha Sebastian study[3] conducted in 2012 the same observations were made in which pulmonary infection accounted for 48 % of ARDS cases followed by sepsis which accounted for 42 % of all cases of ARDS. Also the study conducted by Mahandra M et al[4] concluded the same. The study of Herridge et al[8] found 58% of cases with ARDS had pneumonia as an etiological factor. Smoking, alcoholism and sex all are reported to be associated with mortality[9][10].The study conducted by Sapkal Harish Barsu[5] did not show any such association . This study did not have any significant increase in mortality with smoking and alcoholism. Also this study did not demonstrate a major increase in mortality with smoking just like the Sapkal Harish Barsu[4] study.

We found comorbidities in 48.71% patients which were close to those found in Mahandra M et al[4] where the incidence of comorbidities was 45%. Some studies have shown that DM is associated with decreased risk of developing ARDS[11][12] , but some studies show there is higher mortality of patients with ARDS and DM .The study conducted by Harish Sapkal Barsu[5] did not demonstrate any significant association of DM AND ARDS mortality. This study also does not demonstrate any increase in mortality in cases of DM with ARDS. A multivariate analysis to identify early predictors of survival in ARDS by Monchi et al[13], showed a significant association between mortality and serum bicarbonate level seen on ABG .Thus signifying serum bicarbonate level as an important predictor for mortality in cases of ARDS. In this study we found an increase in the death in patients with low bicarbonate levels. A study by Maskara et al[14] conducted in CMC Vellore showed that lower albumin levels were associated with greater mortality and higher lung injury scores. It was noted that the percentage of non survivors were higher in classes with lower albumin. The mean Albumin among non survivors was lower than that of non survivors , 2.5 versus 2.8 g/dl .In this study we got slightly increased mortality amoung patients with lower albumin levels. In Mahandra M et al[4] study it was found that the average duration of hospital stay was 9.5 days. In Bersten et al[15] and Agarwal et al[6] study the average duration of stay in hospital of patients irrespective of outcome was 10.5 and 9.4 days respectively . In this study the average duration of study was 9.05 which was quite similar to the above studies. A study done by rahul et al[16] found a mortality rate of 44%.

6. Conclusion

The prognosis of ARDS remains bad despite improvement in the treatment strategies. Prompt initiation of treatment and management of complications seem to be the only way to reduce the disease progression and associated mortality. Patients with risk factors require additional attention as clinical courses can be unpredictable. The mortality was, however, found to be more in patients with comorbid conditions especially DM, HTN, IHD.

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