

**Original article:**

## **Clinical profile of acute respiratory distress syndrome at a tertiary care hospital in South India**

**DR SYED MOHAMMED HUSSAIN<sup>1</sup>, \*DR RAGHAVA SHARMA<sup>2</sup>**

<sup>1</sup> Junior Resident, Department of Internal Medicine, K.S.Hegde Medical Academy.

<sup>2</sup> Professor and HOD, Department of Internal Medicine, K.S.Hegde Medical Academy.

Corresponding author\*

### **ABSTRACT**

**Background:** Acute Respiratory Syndrome is a critical illness with very high mortality and morbidity. This study was carried out to study the clinical Profile and outcomes of ARDS in a tertiary care hospital.

**Aim:** To Determine the various etiologies of Acute Respiratory Distress Syndrome and to study its prognosis and outcomes in a tertiary care hospital.

**Materials and Methods:** A total of 40 patients above the age of 18 years who were diagnosed with ARDS at Medical Intensive Care units of a tertiary care hospital for a period of 1 year were included in the study. Their Clinical Profile and their outcomes were studied.

**Results:** ARDS was more common among males and had an overall mortality of 67.5%(27/40), with most of the patient being Hypertensive. The most common etiology was found to be H1N1 followed by Bacterial Pneumonia.

**Conclusion:** Acute Respiratory Distress Syndrome(ARDS) is an important cause of Mortality in ICU patients and H1N1 is an emerging cause of ARDS.

**Keywords:** Acute Respiratory Distress Syndrome(ARDS), H1N1.

### **INTRODUCTION**

Acute Respiratory Distress Syndrome (ARDS) and its milder form Acute Lung Injury (ALI) belong to a group of lung diseases which are characterized by a Severe inflammatory process which cause diffuse alveolar damage and resulting in a variable degree of ventilation-perfusion mismatch, hypoxemia and also poor lung compliance in the absence of Cardiac Failure.

The Lung Injury may be due to direct or indirect causes as in inhalation of obnoxious- toxic substance, aspiration Pneumonia or indirectly as in sepsis. In the tropical countries Malaria, Dengue, leptospirosis are other causes of ARDS. Acute lung Injury is a less severe disorder but has the potential to evolve into ARDS. The mortality rate in a patient of Acute renal failure is about 40%, but in cases of ARDS, it exceeds more than 50%.

The American-European Consensus Conference(AECC) proposed a definition, which is now widely accepted as a simple diagnostic tool for patient characterization. The three diagnostic criteria for ARDS

- (1) The presence of acute severe Hypoxemia( ratio of arterial oxygen tension over fractional inspired oxygen { $\text{PaO}_2/\text{FiO}_2$ } <200 mm Hg)
- (2) Bilateral infiltrates on Chest radiography
- (3) The absence of raised pulmonary artery wedge pressure.

ARDS is associated with high mortality, therefore, the appropriate management in respect to Sepsis Control, Ventilatory support; Intensive, invasive monitoring can be beneficial for the patient. Hence his study was done to assess the clinical characteristics and outcomes of ARDS patients.

**AIM:**

To Determine the various etiologies of Acute Respiratory Distress Syndrome and to study its prognosis and outcomes in a tertiary care hospital.

**MATERIALS AND METHODOLOGY**

This is a retrospective observational study of 40 patients of acute respiratory distress syndrome admitted at the Medical Intensive Care Unit of a teaching hospital in South India.

The study period was between January 2018 to January 2019.

**INCLUSION CRITERIA:**

Based on the American/European consensus statement for the definition of Acute Lung Injury and Acute respiratory distress syndrome.

- 1) Acute onset.
- 2) A pao2/fio2 ratio less than 200 regardless of PEEP level.
- 3) Bilateral infiltrates on Chest Radiography.

**EXCLUSION CRITERIA:**

- 1) Patient less than 18 years.
- 2) Patients with clinical signs of heart failure.

The Case Records were obtained, and the demographic details like Name, Age, Sex, Complication and mortality data were recorded in case record form.

**RESULTS**

**1) SEX DISTRIBUTION:** The Study Group was Comprised by a total population of 40 ARDS Patients, the graph below represents the sex prevalence in this group. Majority of the cases were found in Males (23) 57.5% than among females (17) 42.5%

<b>T</b>	<b>SEX</b>	<b>FREQUENCY</b>	<b>Percentage</b>
<b>a</b>			
<b>b</b>	<b>Male</b>	23	57.5%
<b>c</b>	<b>Female</b>	17	42.5%
<b>d</b>			
<b>e</b>	<b>Total</b>	40	100%

**2) AGE DISTRIBUTION:** The study group was divided into groups based on age. ARDS was found to be most common in the 51-60 years age group, followed by those in the age group of 31-40 years, incidence was the least in the age group above 20 years and below and there were no patients above the age group of 80 years.

AGE OF THE PATIENT	FREQUENCY
18-20	2
21-30	3
31-40	9
41-50	7
51-60	12
61-70	4
71-80	3
Above 80	0
Total	40

**Table 2:** Age Distribution.

**3) CO-MORBIDITIES:** Among the studied population the most common Co-Morbidity was found to be Systemic hypertension(28) followed by Diabetes Mellitus(26).

COMORBIDITIES	FREQUENCY
DIABETES MELLITUS	26
SYSTEMIC HYPERTENSION	28
THYROID DISORDER	8
SEIZURE DISORDER	4

**Table 3:** Co-morbidities.

**4) PRESENTING COMPLAINTS:** The Most common presenting complaints were found to be Fever(39) followed by Cough(29) and then Breathlessness(28).

PRESENTING COMPLAINT	FEVER	COUGH	BREATHLESSNESS
	39	29	28

**Table 4:** Presenting Complaints.

**5) ETIOLOGY:** Among the studied population the most common etiology was found to be H1N1 (12) followed by Bacterial Pneumonia and Leptospirosis.

ETIOLOGY	FREQUENCY
H1N1	12
BACTERIAL PNEUMONIA	9
LEPTOSPIROSIS	9
PANCREATITIS	4
DENGUE	6

**Table 5:** Etiology of ARDS

**6) ISOLATED MICRO-ORGANISM:** The Commonest isolated Microorganism from cultures (Blood, Endotracheal Tube, Urine) was found to be Klebsiella Pneumonia.

ISOLATED MICO-ORGANISM	FREQUENCY
KLEBSIELLA PNEUMONIA	12
ACINETOBACTER	5
PSEUDOMONAS AEUROGINOSA	4
CANDIDA SPECIES	4

**Table 6:** Isolated Microorganism.

**7) OUTCOME:** In the studied population the total mortality was 27 patients (67.5%), the male population had higher mortality of 69.5%(of the total population) when compared to women(64.7%).

SEX	SURVIVED	MORTALITY	PERCENTAGE OF MORTALITY
MALE	7	16	69.5%
FEMALE	6	11	64.70%
TOTAL	13	27	67.5%

**Table 7:** Outcomes.

## DISCUSSION

This was a retrospective study of 40 patients with Acute Respiratory Distress Syndrome(ARDS) conducted at a tertiary care teaching hospital. The objective of our study was to analyze the clinical profile of ARDS patients and to study their outcome.

Our study showed a male predominance with 23 out of 40 subjects (57.5%) of the total population studied. In a similar study done Moss M<sup>1</sup>, Mannino DM showed a male predominance. <sup>(1)</sup>

In our study, the majority of the cases had pre-existing co-morbidities. A study done in the medical ICU at a medical center in Japan found that 89% of the patients who were diagnosed with ARDS has a previously existing Co-morbidity <sup>(2)</sup>. Similar observations were noted in studies from Boston, where the prevalence of co-morbidities was frequently observed in fatal cases<sup>(3)</sup>.

Our Study showed that ARDS was more common among the middle age group. This is in coherence to results reported in other studies done in India; Bhadade et al. in Mumbai concluded that the average age of the patient was 37.9 years<sup>(4)</sup>. Whereas studies done in Boston and Washington showed the average age to be 60 years<sup>(3)</sup>. The lower average age in our study when compared to western studies may be due to the higher percentage of tropical infectious diseases causing ARDS.

In our study, the commonest cause of ARDS was found to be due to infection with H1N1 cases. 12 of the 40 cases were due to H1N1 infection. A study conducted by Topfer L1, Menk M1 concluded that Twenty-one patients with H1N1-ARDS and 41 with non-H1N1-ARDS were identified. Gas exchange was more severely impaired in patients with H1N1-ARDS over time. Extracorporeal membrane oxygenation was more frequently needed in H1N1-ARDS <sup>(5)</sup>.

In the present study, most patients had an infectious cause of ARDS ( 90%, n=36). Most Common cause was H1N1 followed by Bacterial Pneumonia, Leptospirosis, Dengue, the non-infectious cause included Pancreatitis. A study carried out in Canada found that 58% of the cases having pneumonia<sup>(6)</sup>, similarly in the United states studies suggested Pulmonary etiology of sepsis was detected<sup>(7)</sup>. Vigg et al. in a study in India concluded that 30% of the cases of ARDS were due to Pneumonia whereas other causes were due to gastrointestinal cases followed by polytrauma<sup>(8)</sup>.

In the current study, the microbiological diagnosis could be obtained in 37 out of 40 cases in which H1N1 constituted 12 cases. The most common bacterial isolate was Klebsiella Pneumonia (12 cases) followed by Acinetobacter (5 cases). In studies conducted by Vigg et al. found that Pseudomonas Species was more predominant<sup>(8)</sup> which is not similar to our study. In another study which analyzed microbiological pattern within 24 hours of ARDS the most common pathogen was Pseudomonas Species<sup>(9)</sup>, is not similar to our study, but all the species isolated are also commonly isolated from clinical specimens in the ICU hence a larger sample size is required to be studied to reach a proper conclusion.

Previous studies have concluded that the mortality rate of ARDS was high, but over time there has been a decreasing trend. A retrospective study done at Rhode Island Hospital showed that of the 980 patients with ARDS (1990-1998), found a significant decrease in death rate during this period from 70% to 51.5%<sup>(10)</sup>, this is not in coherence according to our observation where the mortality was 67.5%. In first-world countries, the decrease in mortality rates of ARD is due to improvement in management strategies of these patients and easy approach to health care services, and also there is a decreased burden of tropical infections. Hence a larger multi-center study is required to assess the true burden of ARDS mortality in a country like India.

### CONCLUSION

Acute Respiratory Distress Syndrome (ARDS) is an important cause of Mortality in ICU patients and H1N1 is an emerging cause of ARDS.

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