Research Paper

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A Study of Clinical Profile of Acute Respiratory Distress Syndrome

MEDICAL SCIENCE

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ABSTRACT

Objectives : Many studies have been published in western literature on acute respiratory distress syndrome (ARDS). There are very few studies on the pattern of ARDS seen in Indian population. The study was carried out to identify the clinical pattern of Indian patients who died of ARDS. Methods : This was a retrospective study comprising of 49 patients who died of ARDS in the intensive care unit of a tertiary care referral centre. The present study looked at only those patients who died from ARDS and did not evaluate the clinical outcome or survival pattern of ARDS patients. The criteria used for diagnosis of ARDS was based upon American/European consensus statement for definition of acute lung injury(ALI) and ARDS. Results : There were 49 patients during the study period who died of ARDS. 27 males and 22 female patients. Thirteen patients had primary pulmonary infection, 9 had severe sepsis with multiorgan failure, 6 patients had polytrauma and 5 each had recent abdominal surgery and pancreatitis. Length of ICU stay was less than 10 days in 29 patients whereas in 20 patients it was more than 10 days. Duration of mechanical ventilation was less than seven days in 40 patients and more than seven days in 9 patients. Positive body fluid cultures were obtained in 21 out of 98 patients and of these, 7 patients had microbiological diagnosis established by blood culture, another 7 by endotracheal secretion culture, 4 by urine culture and in the remaining 3 patients based upon wound cultures. The commonest organisms isolated from the body fluids were Pseudomonas and Klebsiella. Conclusion : Primary pulmonary infection was associated with ARDS is one-third of patients. Multiorgan failure was seen in 18% of patients who died from ARDS. Severe sepsis was identified as a significant risk factor for ARDS.

INTRODUCTION

Acute respiratory distress syndrome (ARDS) is a devastating clinical disorder that is seen in critically ill patients with broad range of clinical disorders characterized by widespread inflammatory response. Several studies have been published in Western literature on incidence, prevalence, clinical course outcome and mortality in patients with ARDS.1-3 Extensive animal research suggests that parenchymal lung injury and an inflammatory response may be caused and perpetuated if mechanical ventilation results in alveolar units with tidal breathing.4 On the basis of this work, pressure limited, lung-protective mechanical ventilatory strategies have been proposed for acute respiratory distress syndrome (ARDS),5,6 emphasizing the need to "open the lung and keep it open" while avoiding alveolar over-distention. Amato and colleagues7 in a randomized controlled trial recently found reduced mortality in ARDS patients managed with such an approach. Because conventional ventilation strategies have been associated with lung injury, current objectives include optimization of gas exchange and prevention of further injury to the lung. By definition, "conventional" ventilator settings has usually implied high airway pressures and tidal volumes in the range of 15 ml per kg body weight. Recent studies have altered physiologic thinking and clinical practice by showing better outcomes with lower tidal volumes and airway pressure limits.8 Strategies for "protective ventilation" of lungs in ARDS have been characterized not only by reduced tidal volume, higher levels of positive end-expiratory pressure but also by tolerance of higher levels of PaCO2 than those associated with conventional settings.

MATERIAL AND METHODS

This is a retrospective study carried out on 49 patients who died of ARDS in intensive care unit of a tertiary care referral centre. This study looked at only those patients who died from ARDS and did not evaluate the clinical outcome or survival pattern of ARDS patients. Only those patients were included in the study who had died of ARDS. The criteria used for diagnosis of ARDS was based upon American/European consensus statement for definition of ALI and ARDS[9] which includes:

1.Acute onset

2.Bilateral infiltrates on chest radiographs

3.Absence of clinical signs of left atrial hypertension or if PA catheter is present then pulmonary artery opening pressures <15 mmHg.

4.PaO2: FiO2 ratio <200.

Routine standard care offered to these critically ill patients comprised of intensive nursing care, haemodynamic monitoring, central venous pressure line, arterial line, nasogastric tube aspiration, endotracheal intubation, mechanical ventilatory support, total parenteral nutrition (TPN), intravenous crystalloid infusion with serial monitoring of haematological and biochemical parameters including monitoring for DIC. The patient demographic data consisted of age, sex,associated major illness in the past, clinical disorders associated with ARDS, length of hospital stay, use and duration of mechanical ventilation and the presence of sepsis and organ failure defined by ACCP/SCCM consensus conference definition.[10] Severity of illness was measured by the acute physiology and chronic health evaluation II(APACHE II) scores. The multiple organ dysfunction (MOD) score was determined on the day of onset of ARDS for all patients.

RESULTS

There were 49 patients during the study period who died of ARDS. 27 were males and 22 were female patients.

Age distribution was as follows:<20 years = 5

21-40 years = 27

41-60 years = 10

>60 years = 7

As shown above clearly the majority of the patients were between 20-60 years.

Thirteen patients had past history of NIDDM, 10 had hypertension, eight had coronary artery disease and 20 patients had underlying respiratory problems such as COPD (n=11), bronchial asthma (n=5), tuberculosis (n=2) and interstitial lung disease (n=2), HIV infection was seen in two patients and both were possitive by ELISA technique. They were coincidentally detected to be HIV positive. CD4,CD8 count was not done in both cases.

No. of patients with tracheostomy : 20

No. of patients who developed ARDS : 19 following surgery

a) after elective surgery : 9

b) after emergency surgery : 10

The mean lung injury score (LIS), mean multiple organ dysfunction (MOD) score and the mean APACHE II scores have been all grouped together in Table 1. Length of ICU stay was less than 10 days in 29 patients whereas in 20 patients the length of ICU stay was more than 10 days.

Duration of mechanical ventilation was less than seven days in 40 patients and more than seven days in 9 patients. Severe sepsis with multiorgan failure was seen in 9 patients and all these patients had overt disseminated intravascular coagulation (DIC). Primary pulmonary infection was seen in 15 out of 49 patients (30%) as shown in Table 2. Gastrointestinal disorders accounted for 25% of patients. Out of these pancreatitis alone was associated with ARDS in 10% of patients (Table 2).

TABLE 1: Mean clinical scores

SCORES	MEAN VALUE
Mean lung injury scores (LIS)	2.76 ± 1.8
Mean multiple organ dysfunction (MOD) score	9 ± 2.0
Mean APACHE II scores	28 ± 3.0

TABLE 2: Clinical disorders associated with ARDS

UNDERLYING DISEASES	NUMBERS
Primary pulmonary infection	14
Recent (less than 2 weeks) abdominal surgery	5
Severe sepsis with multiorgan failure	9
Peritonitis	3
Polytrauma	6
Thermal burns > 40%	3
Pancreatitis	5
Plasmodium falciparum malaria	2
Acute viral fuliminant hepatitis	1
Organophosphorus poisoning	1

DISCUSSION

Thorough literature search has shown very few studies on ARDS in Indian literature which are mainly on ARDS with various tropical infections like malaria, miliary tuberculosis and dengue infections. In the present study majority of patients were males (n=26, 52%) and mean age was 39.2 ± 2.5 years which is similar to reports from other studies.3 In our study microbiological diagnosis could be obtained in only 24 out of 49 patients (49%) as shown in Table 3.

TABLE 3: Pattern of positive body fluid cultures

BODY FLUID CULTURES	NUMBERS
Blood culture	10
Wound culture	3
Endotracheal secretions culture	4
Urine culture	7

The maximum yield was from blood cultures followed by endotracheal secretions culture. The commonest organism isolated from various blood cultures was Pseudomonas species followed by Klebsiella. Risk factors for ARDS included primary pulmonary infection in 29.4% (n=15), gastrointestinal disease in 25% (n=12), polytrauma in 12% (n=6) and other disorders in 44%. When compared to the study by Estenssoro et al2 from South Africa which showed sepsis in 44%, shock in 5%, trauma 11%, gastric aspiration 10% and others 34%. Overall results of this study are comparable to the study by Vigg et al11 as well as Alberti et al12.

CONCLUSION

Primary pulmonary infection was associated with ARDS in nearly one-third of patients. Multi-organ failure was seen in 21% of patients who died from ARDS. Severe sepsis was identified as a significant risk factor for ARDS. Early recognition, prompt treatment of sepsis and routine use of lung protective ventilatory strategy may help to reduce mortality due to ARDS.

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