Modern Trends in Early Diagnosis of Acute Respiratory Distress Syndrome

Kuzovlev AN*

V.A. Negovsky scientific research institute of general reanimatology RAMS, Moscow, Russia

Acute respiratory distress syndrome (ARDS) is a noncardiogenic pulmonary edema, in the basis of which lies an alteration (dystrophy, necrosis, apoptosis) of alveolar epithelium, pulmonary microcirculation endothelium, and their basal membranes (including structures of aerothematic barrier) by endogenous and exogenous aggressive factors, leading to vascular permeability growth and development of acute respiratory failure [1,2].

For many years since its first description in 1967 [3] ARDS has remained a critical condition with a high morbidity and mortality [4], which is in great deal due to an inability of the currently used clinical ARDS criteria to detect the early stage of the syndrome. The problem of prompt diagnosis is of great significance for critical care medicine: the earlier we diagnose the critical condition, the broader spectrum of treatment approaches we have and the better are the outcomes.

Three diagnostic tools for ARDS are currently available: the Murray score [5], the American-European consensus conference criteria [6], the Delphi criteria [7]. The Murray score is not designed to differentiate between stages of ARDS and no data exist that this score correlates with outcomes [8]. The widely used American-European consensus conference criteria are based on oxygenation index and chest X-ray. Oxygenation index decrease is an important marker of ARDS, but is highly dependent on numerous clinical variables apart from ARDS (pneumonia, atelectasis, bronchial obstruction etc). The chest X-ray, especially made by a portable machine, is not informative for the diagnosis of early ARDS stage: bilateral pulmonary infiltrates are only detected at later stages [1,2,9,10]. The Delphi criteria, which take into account the influence of positive end-expiratory pressure on oxygenation index, did not win popularity among clinicians [7]. The recent definition of ARDS proposed at the 2011 ESICM Annual Congress deals not only with routine criteria, but also with the timing, physiological derangements and 3 degrees (mild, moderate and severe) of ARDS. This is a step forward for diagnosing an early ARDS stage. But none of the abovementioned criteria are based on the pathogenesis of the early ARDS stage.

Pathogenesis, diagnosis and treatment of ARDS have long been an area of interest for the scientists of the V.A. Negovsky scientific research institute of general reanimatology. A multicenter investigation (pathological, experimental, clinical) carried out at the V.A. Negovsky scientific research institute of general reanimatology in 2000-2011 (pathological, experimental, clinical) carried out at the V.A. Negovsky scientific research institute of general reanimatology. A multicenter investigation into the pathogenesis of the early ARDS stage.

Therefore, the diagnostic algorithms in critical care medicine should be based on the pathogenesis of the critical state. The knowledge of the pathogenesis of the early ARDS stage made it possible to develop a modern diagnostic approach, which is effective and recommended to be implemented into a daily practice. Future research is focused on investigations into novel biomarkers of ARDS.

References

1. Moroz V, Goloubev A, Kuzovlev AN (2010) Acute respiratory distress syndrome: new classification. Semin Cardiothorac Vasc Anesth 14: 46.
2. Moroz V, Goloubev (2007) A Classification of acute respiratory distress syndrome. General Reanimatology 3: 7-9.
3. Ashbaugh DG, Bigelow DB, Petty TL, Levine BE (1967) Acute respiratoty distress in adults. Lancet 2: 319-323.
4. Lewandowski K, Lewandowski M (2006) Epidemiology of ARDS. Minerva Anestesiol 72: 473-477.
5. Murray JF, Matthay MA, Luoz JM, Flick MR (1988) An expanded definition of the adult respiratory distress syndrome. Am Rev Respir Dis 138: 720-723.
6. Bernard GR, Artigas A, Brigham AM, Carlet J, Falke K, et al. (1994) The American-European Consensus Conference on ARDS. Definitions, mechanisms, relevant outcomes, and clinical trial coordination. Am J Respir Crit Care Med 149: 818-824.
7. Ferguson ND, Davis AM, Slutsky AS, TE (2005) Development of a clinical definition for acute respiratory distress syndrome using the Delphi technique. J Crit Care 20: 147-154.
8. van der Heijden M, Groeneveld AB (2010) Extravascular lung water to blood volume ratios as measures of pulmonary capillary permeability in nonseptic critically ill patients. J Crit Care 25: 16-22.
9. Moroz VV, Goloubev AM (2006) Principles of early stages of acute lung injury diagnosis. General Reanimatology II: 5-7.
10. Kuzovlev AN, Moroz VV, Goloubev AM, Prskovnikov SG (2010) Diagnosis of acute respiratory distress syndrome in nosocomial pneumonia. Semin Cardiothorac Vasc Anesth 14: 231-241.
11. Matthay M (2008) Measurement of extravascular lung water in patients with pulmonary edema. Am J Physiol Lung Cell Mol Physiol 294: 1021-1022.

Table 1: Early ARDS stage new diagnostic criteria, developed at the V.A. Negovsky scientific research institute of general reanimatology [1-2].

- Acute onset
- Extravascular lung water index >7 ml/kg
- Oxygenation index <300 mmHg
- No left-ventricular insufficiency
- No signs of ARDS in direct chest X-ray

*Corresponding author: Kuzovlev AN, MD, PhD. V.A. Negovsky scientific research institute of general reanimatology RAMS Moscow, Russia, E-mail: artem_kuzovlev@mail.ru

Received February 29, 2012; Accepted March 03, 2012; Published March 05, 2012

Citation: Kuzovlev AN (2012) Modern Trends in Early Diagnosis of Acute Respiratory Distress Syndrome. J Pulmonar Respir Med 2:e104. doi:10.4172/2161-105X.1000e104

Copyright: © 2012 Kuzovlev AN. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.