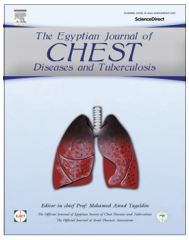
Egyptian Journal of Chest Diseases and Tuberculosis (2016) **65**, 485–489

HOSTED BY

The Egyptian Society of Chest Diseases and Tuberculosis

Egyptian Journal of Chest Diseases and Tuberculosis

www.elsevier.com/locate/ejcdt
www.sciencedirect.com



ORIGINAL ARTICLE

Zinc Levels in community acquired pneumonia in hospitalized patients; a case control study

Moomin H. Bhat, Mudassir, Aadil B. Rather *, Gh Nabi Dhobi, Ajaz N. Koul, Fayaz A. Bhat, Ashaq Hussain

Departments of Infectious Disease, SKIMS, Soura, Srinagar, Jammu and Kashmir, India

Received 16 November 2015; accepted 29 December 2015
Available online 12 January 2016

KEYWORDS

Pneumonia;
Serum zinc;
Outcome

Abstract *Introduction:* Pneumonia usually connotes the infection of pulmonary parenchyma. Pneumonia is best classified according to the setting in which it occurs i.e community acquired pneumonia (CAP) hospital acquired or immunodeficiency associated. Dietary zinc deficiency is widespread in developing countries. Zinc deficiency is related to the morbidity and mortality in CAP.

Aims and objectives: To compare serum zinc values of community acquired pneumonia patients with healthy controls and to see the effect of zinc levels with severity of pneumonia.

Methods and materials: A case control study involved 100 patients of community acquired pneumonia with age and sex matched healthy controls, after getting informed consent from all subjects. The serum zinc level was measured, analyzed and interpreted with regard to age, CURB-65, comorbidity and hospital stay.

Results and observation: The mean age of patients was 59.74 years. 53 patients were males and 47 were females. Smoking history was present in 55 patients. The mean serum zinc level in patients was 89.9 μg/dl whereas in controls it was 105.65 μg/dl, which was statistically significant. The zinc levels were low in elderly patients and controls as compared to young ones. Mean zinc level was lower in patients of high CURB-65 score and vice versa.

Summary: Our study revealed a definite relation of low serum levels of zinc with community acquired pneumonia and there is definite decrease in serum zinc levels as the age increases. Considering the morbidity, mortality, hospital stay and financial burden and to reduce the use of antibiotics for pneumonia, especially in developing countries like ours, serum zinc levels should be routinely measured and thereby supplemented.

Introduction

Pneumonia is an inflammation of pulmonary parenchyma resulting in exudative solidification (consolidation) of

* Corresponding author.
E-mail address: zuhaaadil@gmail.com (A.B. Rather).

Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

http://dx.doi.org/10.1016/j.ejcdt.2015.12.020

pulmonary tissue that may be infectious or non infectious in nature; however in medical parlance, pneumonia usually connotes the infection of pulmonary parenchyma [1]. From the patient management point of view pneumonia is best classified according to the setting in which it occurred i.e community acquired pneumonia (CAP), hospital acquired or immunodeficiency associated infection.

Community acquired pneumonia is a common and major cause of mortality and morbidity especially in developing world. Its incidence is 20–30% in developing world compared to 3–4% in developing world [2]. Risk factors for community acquired pneumonia include increasing age and comorbid illnesses like cardiac failure, diabetes, neoplasia and COPD.

Five decades back it was considered improbable that zinc deficiency could occur and lead to any significant clinical problems. Zinc has been shown to play an important role in the regulation of the T cell-mediated function [3–5]. Dietary zinc deficiency is widespread in developing countries [6] and is often aggravated by intercurrent acute and chronic infections [7]. Zinc is involved in numerous aspects of cellular metabolism. It is required for the catalytic activity of approximately 100 enzymes [8–10] and it plays a role in immune function [10,11], protein synthesis, wound healing, DNA synthesis, and cell division [10]. Zinc also supports normal growth and development during pregnancy, childhood, and adolescence [12,13] and is required for proper sense of taste and smell [14]. A daily intake of zinc is required to maintain a steady state because the body has no specialized zinc storage system [15].

Recently some investigators have found that zinc deficiency is related to the morbidity and mortality in community acquired pneumonia. These studies have been done in children [16,17].

Until recently very few studies have been done to elucidate the role and relationship of zinc with the morbidity and mortality in community acquired pneumonia. Some investigators have found that patients with normal serum zinc levels are less likely to have infections like community acquired pneumonia and less frequent antibiotic use [18].

Aims and objectives

1. To compare the serum zinc values of community acquired pneumonia patients with healthy controls.
2. To see the effect of serum zinc levels with severity of pneumonia.

Methods and materials

The study was a hospital based prospective study comprising 100 patients attending inpatient department of Sher-I-Kashmir Institute of Medical Sciences (SKIMS), a tertiary care institute in an urban area of Kashmir, India. For the purpose of the present study, serum zinc levels were taken at the time of admission and the CURB 65 score was evaluated at that time. In addition demographic characteristics, comorbidities, clinical features, vaccination status, causative agents, therapy, and outcomes were noted. An informed consent was taken from patients as well as controls.

Inclusion criteria

Community acquired pneumonia was defined as an acute illness (fewer than 14 days of symptoms), the presence of new chest infiltrates, and clinical features suggestive of acute pneumonia. The clinical features required will be one of group A (fever > 37.8 C, hypothermia < 36 C, cough and sputum production) or two of B (dyspnea, pleuritic pain, physical findings suggestive of lung consolidation and leukocyte count greater than 12,000 or less than 4000). These criteria are consistent with the published guidelines of community acquired pneumonia.

Exclusion criteria

These include:

(1) Patients with severe immunodeficiency as defined by the Centres for Disease Control Criteria for patients with acquired immune deficiency syndrome.
(2) Patients receiving chemotherapy in the past 60 days.
(3) Patients receiving treatment with corticosteroids equivalent to prednisolone at more than 20 mg/day for more than 14 days.
(4) Patients receiving immunosuppressive drugs.
(5) Active neoplastic disease.

Other investigations

- Basic chemistry and hematology tests.
- Arterial blood gas.
- Chest radiography.
- Sputum for Gram staining and culture.

Serum zinc levels were taken from the patients of CAP. Also samples were taken from the age and sex matched control, which were taken from the general population.

While taking blood samples for serum zinc levels in CAP patients strict septic precautions were taken and it was made compulsory to avoid contamination of sample. Later zinc levels were measured by Colorimetric method with 5-Bromo-PAPS.

Results and observation

Our study comprised 100 patients of community acquired pneumonia. The mean age of patients was 59.74 years. From the total number of patients 53 were males and 47 patients were females. Smoking history was present in 55% of patients of community acquired pneumonia. Cough was the commonest symptom present in 89% of patients followed by breathlessness in 76% of patients, altered sensorium in 21% of patients, with the least common symptom being hemoptysis present in only 7% of CAP patients. 65% our patients had a curb-65 score of 2–3 (Table 1). More than half of our patients were hypertensive (55%), with COPD being present in 42% of patients, 17% were diabetic, 6 patients were labeled as having coronary artery disease. 7 patients were suffering from chronic kidney disease, 2 patients were having chronic liver disease.71% of our patients had consolidation on chest X-ray, infiltrates in 21 patients with 4 patients had both. Pleural effusion was seen in 4 patients (Table 3). The mean PH value