Correlation of Obesity with Outcomes in Hospitalized Patients with Community-Acquired Pneumonia (CAP)

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ABSTRACT

Introduction
CAP is the leading cause of infectious death worldwide. Obesity is now recognized as a new worldwide pandemic. During the 2009 influenza A H1N1 pandemic, patients who were obese had poor clinical outcomes. Data are limited regarding the impact of obesity on the outcomes of patients with CAP not infected with 2009 Influenza A H1N1.
Objective
The objective of this study was to compare mortality for hospitalized patients with CAP with normal body mass index (BMI) with patients with elevated BMI.
Methods
This was a secondary data analysis of the Community-Acquired Pneumonia Organization (CAPO) international cohort study database. Log-binomial regression was used to determine the adjusted impact of obesity on mortality.
Results
A total of 1,343 patients with normal BMI and 1,446 with increased BMI (obese) were included in the study. After adjusting for confounding factors, there was a 27% decreased risk of 30-day mortality for obese patients compared to those with a normal BMI.
Conclusions
This study indicates that obesity is protective for mortality in hospitalized patients with CAP. Our data are in agreement with two recent publications indicating that obese patients with CAP have improved survival. Obese patients have an exaggerated inflammatory state at baseline that may be protective during an episode of CAP. A clear understanding of the protective effect of obesity on mortality may help to define new therapeutic strategies.

INTRODUCTION

CAP is a leading cause of death and hospitalization, costing health care systems billions of dollars and an estimated 600,000 adult deaths worldwide each year(2).The incidence of obesity has increased rapidly during recent decades. More than 30% of Americans are obese, as are more than a quarter of men and women in several European countries(1).The purpose of this study is to find the difference in mortality rate among 1446 Obese VS 1343 Non Obese patients hospitalized with community acquired pneumonia during hospitalization and after 30 days follow up. . Data are limited regarding the impact of obesity on the outcomes of patients with CAP.
Objective
The objective of this study was to compare mortality for hospitalized patients with CAP with normal body mass index (BMI) with patients with elevated BMI.

DISCUSSION

THE MECHANISMS OF OBESITY IN INFECTIOUS DISEASES

Obesity has been shown to have substantial effects on immune surveillance(3) .Immune system cells and adipocytes evince similarities in structure and function such as the production of various inflammatory mediators(3,4). Adipose tissue mediates immune system and adipose tissue interactions by the secretion of adipokines, for example, leptin(4) .The differentiation of macrophages has been shown to be affected by the presence of obesity(5).

METHODS

This was a secondary data analysis of the Community-Acquired Pneumonia Organization (CAPO) International Cohort Study database. Data was collected between 2009 and 2015. In each participating center, non-consecutive medical records of hospitalized patients with the diagnosis of CAP were reviewed. A sample of the data collection form is available at the study website (www.caposite.com). Validation of data quality was performed at the study center before the case was entered in to the CAPO database. Institutional Review Board approval was obtained by each participating center.

Study Definitions

CAP: Diagnosis of CAP required the presence of criteria A, B, and C:

A. New pulmonary infiltrate on imaging (CT scan or chest x-ray) at the time of admission to the hospital.

A. Signs and Symptoms of CAP (at least one of the following)
   1. New or increased cough (per the patient)
   2. Fever >37.8°C (100.0°F) or hypothermia <35.6°C (96.0°F).
   3. Changes in WBC (leukocytosis >11,000 cells/mm3, left shift > 10% band forms/microliter, or leukopenia < 4,000 cells/mm^3

B. Working diagnosis of CAP at the time of hospital admission with antimicrobial therapy given within 24 hours of admission.

Statistical Analysis
Log-binomial regression was used to determine the adjusted impact of obesity on mortality. All data were analyzed in R v.3.1.1 (R Foundation for Statistical Computing, Vienna, Austria). For the purposes of our research a P-value of ≤ 0.05 was considered statistically significant.

RESULTS

- A total of 1,343 patients with normal BMI and 1,446 with increased BMI (obese) were included in the study.
- After adjusting for confounding factors, there was a 27% decreased risk of 30-day mortality for obese patients compared to those with a normal BMI.
- Hospital Mortality Rates for Obese and Non Obese patients with a P-value of 0.054 is depicted in Figure 1
- 30 day hospital mortality is depicted in Figure 2

RESULTS

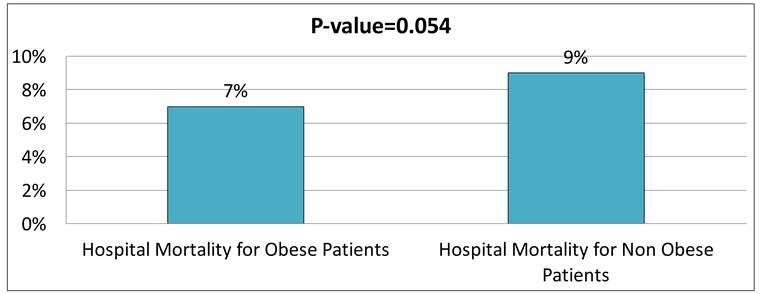

Figure 1 Hospital Mortality

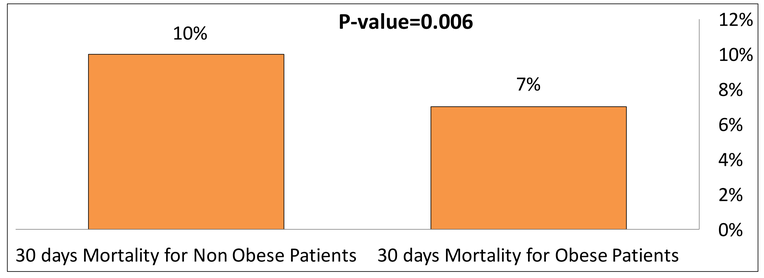

Figure 2 30 day Hospital Mortality

CONCLUSIONS

- This study indicates that obesity is protective for mortality in hospitalized patients with CAP.
- Our data are in agreement with two recent publications indicating that obese patients with CAP have improved survival.
- Obese patients have an exaggerated inflammatory state at baseline that may be protective during an episode of CAP.
- A clear understanding of the protective effect of obesity on mortality may help to define new therapeutic strategies.

REFERENCES

1- Berghofer A, Pischon T, Reinhold T, Apovian CM, Sharma AM, Willich SN. Obesity prevalence from a European perspective: a systematic review. BMC Public Health 2008; 8: 200.
2-http://www.news-medical.net/?tag=/Pneumonia
3- Marti A, Marcos A, Martinez JA. Obesity and immune function relationships. Obes Rev 2001; 2: 131–140.
4- Nave H, Beutel G, Kielstein JT. Obesity-related immunodeficiency in patients with pandemic influenza H1N1. Lancet Infect Dis 2011; 11: 14–15. .
5-http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1783744.