

# PNEUMONIA AND CARDIAC INSUFFICIENCY BEYOND A BIDIRECTIONAL UNDERSTANDING

NEUMONÍA E INSUFICIENCIA CARDIACA, MÁS ALLÁ DE UN SENTIDO BIDIRECCIONAL

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## Dear Editor

Community-acquired pneumonia (CAP) remains a hot topic, and it is defined as an acute inflammatory disorder of lung parenchyma in patients who have acquired the infection in the community and have not been hospitalized during the past 3 weeks<sup>1</sup>.

CAP is the most lethal infectious disease in the world, and its increasing incidence is a consequence of the increment chronic diseases, immunosuppression and life expectancy. As a result, which leads to an increase in vulnerable population<sup>2</sup>.

On the other hand, heart failure (HF) along with other cardiovascular diseases (CVD) are the leading cause of death in the world<sup>3</sup>. Cardiovascular diseases rank fourth in Peru<sup>4</sup>.

The CAP guidelines of the Peruvian Society of Infectious and Tropical Diseases states that heart failure is among the risk factors of CAP, table 11. However, there is controversy about the direction of the causal relationship of heart failure (HF) against community-acquired pneumonia.

The ambivalence is whether HF leads to immunocompromisation that offers a gateway to the infectious agents, or if CAP appears as a factor associated with the development of cardiovascular disease. Lastly, Corrales et al. suggest some repercussions of acute pneumonia in the cardiovascular system, table 2<sup>5</sup>.

**Table 1.** Risk factors associated with community-acquired pneumonia.

RISK FACTOR	
Bronchial and parenchymal structural disease	COPD <sup>1</sup> Bronchiectasis
Congenital or acquired immunodeficiency	
Smoking	
Alcoholism	
Recent viral respiratory infections	
Cardiac insufficiency	
Immunosuppressive therapy	
Chronic liver diseases	
Neoplasms	
Exposure to low temperatures <sup>2</sup>	
1 COPD: chronic obstructive pulmonary disease 2 Especially in the elderly	

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**Quote as:** Paola L. A. Oruro-Cari. Pneumonia and cardiac insufficiency beyond a bidirectional understanding. [Letters to the Editor]. 2019;19(2):123-125. (April 2019). DOI 10.25176/RFMH.v19.n2.2073

**Table 2.** Effects of Acute Pneumonia on the cardiovascular system.

EFFECTS ON CARDIOVASCULAR COMPONENTS	
Endothelium	↓PVR in young adults ↑ PVR in middle-aged adults
Miocardio	↓ Función ventricular izquierda
Heart rate	Acute cardiac arrhythmias
Coronary arteries	Inflammatory change of Atherosclerosis plaques Coronary Vasoconstriction
Pulmonary circulation	Lung blood pressure increase
Cardiac autonomic function	Impairment
Coagulation	Increase in activity
Renal function and osmo-balance	↑Production of AVP ↓ ACE activity Retention of water Kidney acute injury
NA: Acute pneumonia RVP: Peripheral vascular resistance AVP: Arginine vasopressin ACE: Angiotensin converting enzyme	

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In the of 2013 cardiology clinical practice guide, published by the ministry of health, the factor of association is not considered as CI, table 3<sup>6</sup>.

A cardiovascular event in the CAP pathway gives a lousy prognosis. In a review by Cillóniz et al., it was recorded that approximately one-fifth of cases are associated with cardiovascular complications and IC is among the most common reasons for readmission<sup>7</sup>. This may be due to complications of the disease. The study of Violi et al. explain that the mortality of

patients with CAP was higher (17.6%) in patients who develop CVD compared to those who did not developed CVD (4.5%)<sup>8</sup>. Although in another study, age and comorbidity were not associates to CAP in the hospitable admission. The age variable had an association with death due to the same cause<sup>9</sup>. In turn, Feldman et al. indicate that a 30% of hospitalized patients by CAP reach to develop an ECV<sup>10</sup>. However, we talk about short- term events.

**Table 3.** Risk factors associated with heart failure.

ENVIRONMENT		
Does not apply		
LIFESTYLES		
Obesity		
Physical inactivity		
Atherogenic diet		
HEREDITARY FACTORS		
Family history of premature coronary disease		
Coronary disease in first-degree relatives	Men	55 years old
	Women	65 years old

A cohort study in Canada showed that community-acquired pneumonia substantially increases the risk of long-term heart failure. As a result, patients with CAP that are less than or equal to 65 years of age are 1.98 times more likely to develop HF. Unlike patients older than 65 years whose relative risk is lower. It also increases the probability of being hospitalized for an incident related to heart failure one year after discharge (RR = 1.86, 1.50 to 2.32,  $p < 0.001$ )<sup>11</sup>.

The population below 65 years is not likely to contract

pneumonia in the community and to not consider pneumonia as a risk factor for HF would expose the economically active population (EAP) to cardiovascular events. This would create a greater loss of productivity in the young population due to the incidence of CVD. It is proposed that in the next update of clinical management guidelines, pneumonia should be evaluated as a comorbidity of HF emphasizing the adult population under 65 as vulnerable in long term periods and promoting preventive strategies of the case.

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