Association between non-alcoholic fatty liver disease and hospitalized patients with community-acquired pneumonia

Pneumonia continues to be a serious medical condition with high morbidity and mortality worldwide. Community-acquired pneumonia (CAP) is a common potentially serious illness [1]. The majority of cases are managed outside a hospital setting, but approximately 20% require hospital admission. Measures are still being taken to determine new risk factors, evaluate the severity (new biomarkers and medical scores), and discover new treatment modalities.

Non-alcoholic fatty liver disease (NAFLD) is a chronic liver disease, which refers to the presence of hepatic steatosis without significant intake of alcohol. The estimated worldwide prevalence of NAFLD is approximately 20–30% of the adult population. NAFLD is an asymptomatic disease that can progress to non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis, and hepatocellular carcinoma [2]. Obesity and diabetes are frequently associated with NAFLD. It has been suggested that diabetes is associated with an increased incidence of acute bacterial infections (e.g., CAP, urinary tract infections, and sepsis). The association between NAFLD and bacterial infections is still unclear [3].

Against this background, we conducted a retrospective study that included 141 consecutive patients with CAP who were hospitalized after evaluation in the Emergency Department during a period of 3 years. We included subjects with CAP who were older than 18 years of age with imaging data of the liver by abdominal ultrasonography, computed tomography, or both. We excluded patients with structural lung disease or those who were immunocompromised. A control group comprised 141 consecutive patients who were hospitalized during the same study period, matched for age, gender and body mass index, with imaging data of the liver and with no evidence of current infectious disease. Among 57 subjects from the study group, 40.4% showed evidence of NAFLD vs. 39 (27.6%) of the controls ($P = 0.023$). The mean C-reactive protein (CRP) levels were significantly higher in patients with CAP than in the control group (21.4 ± 10 vs. 2.5 ± 2 mg/dl, $P < 0.001$, respectively) [Table 1]. Multivariate analysis after adjustment of potential confounders showed that NAFLD (odds ratio 2.5, 95% confidence interval 2.0–3.15, $P = 0.023$) was associated with CAP.

Table 1. Demographic, clinical, and laboratory characteristics of the hospitalized patients with CAP and the control group

	Patients with CAP (n=141)	Control group (n=141)	*P* value
Age (yr), mean ± SD	63.1 ± 18	63.7 ± 12	NS
Gender (male) n (%)	90 (63.8)	90 (63.8)	NS
BMI (kg/m²), mean ± SD	30 ± 3.9	29.7 ± 4.4	NS
Diabetes mellitus, n (%)	66 (46.8)	75 (53.2)	NS
CHF, n (%)	36 (25.5)	39 (27.6)	NS
Glomerular filtration rate (ml/min), mean ± SD	89.2 ± 43.3	83.2 ± 33.5	NS
COPD, n (%)	31 (22.6)	26 (19.2)	NS
Smoker, n (%)	50 (35.5)	40 (29.4)	NS
NAFLD, n (%)	57 (40.4)	39 (27.6)	0.023
CRP (mg/dl)	21.4 ± 16	2.5 ± 2	< 0.001

SD = standard deviation, NS = not significant, CAP = community-acquired pneumonia, BMI = body mass index, CHF = congestive heart failure, COPD = chronic obstructive pulmonary disease, NAFLD = non-alcoholic fatty liver disease, CRP = C-reactive protein

The mechanisms that may be responsible for increased incidence of bacterial infections in patients with fatty liver are still unclear. Alterations in the immunity system could be one of the mechanisms [4].

In summary, this case-control study showed that NAFLD was associated with CAP. Since this study is the first to find this association, additional studies with larger numbers of patients are required to determine this association. Moreover, if this relationship between CAP and fatty liver will be proven, more studies should be undertaken to determine whether the presence of fatty liver can affect the course of CAP.

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"Solitude produces originality, bold and astonishing beauty, poetry. But solitude also produces perverseness, the disproportionate, the absurd and the forbidden"

Thomas Mann (1875-1955), German novelist, short story writer, social critic, philanthropist, essayist, and laureate of the 1929 Nobel Prize in Literature