

BMC Cardiovasc Disord. 2023 Nov 24;23(1):579. doi: 10.1186/s12872-023-03585-1.

Value of inferior vena cava collapsibility index as marker of heart failure in chronic obstructive pulmonary disease exacerbation

Cyrine Kouraichi ^{1 2}, Adel Sekma ^{1 2}, Khaoula Bel Haj Ali ^{1 2}, Ikram Chamtouri ³, Sarra Sassi ^{1 2}, Marwa Toumia ^{1 4}, Hajer Yaakoubi ⁵, Rym Youssef ⁵, Mohamed Amine Msolli ^{1 2}, Kaouthar Beltaief ^{1 2}, Zied Mezgar ⁶, Mariem Khrouf ⁶, Wahid Bouida ^{1 2}, Zohra Dridi ⁶, Riadh Boukef ^{1 5}, Hamdi Boubaker ^{1 2}, Mohamed Habib Grissa ^{1 2}, Semir Nouira ^{7 8 9}

Affiliations

PMID: 37996792 DOI: 10.1186/s12872-023-03585-1

Abstract

Introduction: Inferior vena cava (IVC) diameter variability with respiration measured by ultrasound was found to be useful for the diagnosis of heart failure (HF) in ED patients with acute dyspnea. Its value in identifying HF in acute exacerbation of chronic obstructive pulmonary disease exacerbation (AECOPD) was not specifically demonstrated.

Objective: To determine the value of Δ IVC in the diagnosis of HF patients with AECOPD.

Methods: This is a prospective study conducted in the ED of three Tunisian university hospitals including patients with AECOPD. During this period, 401 patients met the inclusion criteria. The final diagnosis of HF is based on the opinion of two emergency experts after consulting the data from clinical examination, cardiac echocardiography, and BNP level. The Δ IVC was calculated by two experienced emergency physicians who were blinded from the patient's clinical and laboratory data. A cut off of 15% was used to define the presence ($< 15\%$) or absence of HF ($\geq 15\%$). Left ventricular ejection fraction (LVEF) was also measured. The area under the ROC curve, sensitivity, specificity, and positive and negative predictive values were calculated to determine the diagnostic and predictive accuracy of the Δ IVC in predicting HF.

Results: The study population included 401 patients with AECOPD, mean age 67.2 years with male (68.9%) predominance. HF was diagnosed in 165 (41.1%) patients (HF group) and in 236 patients (58.9%) HF was excluded (non HF group). The assessment of the performance of the Δ IVC in the diagnosis of HF showed a sensitivity of 37.4% and a specificity of 89.7% using the threshold of 15%. The positive predictive value was 70.9% and the negative predictive value was 66.7%. The area under the ROC curve was 0.71(95%, CI 0.65-0.76). Δ IVC values were not different between HF patients with reduced LVEF and those with preserved LVEF.

Conclusion: Our results showed that Δ IVC has a good value for ruling out HF in ED patients consulting for AECOPD.

Keywords: Collapsibility index; Dyspnea; Emergency AECOPD; Heart failure; Ultrasound.

© 2023. The Author(s).

[PubMed Disclaimer](#)

LinkOut – more resources

Research Materials

[NCI CPTC Antibody Characterization Program](#)

Miscellaneous

[NCI CPTAC Assay Portal](#)