A systematic review on the comparison of the role of internal jugular vein, inferior vena cava and carotid ultrasound measurements in assessment of patients with heart failure

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Introduction:
Recent reports suggested to use Internal Jugular Vein (IJV), Inferior Vena Cava (IVC) and Carotid ultrasound measures to confirm congestion and to predict prognosis in Heart Failure (HF) patients. Our aims were to check the validity of the previous US measures in predicting HF diagnosis and prognosis.

Methods:
This review was based on the PRISMA guideline. The systematic search of the literature published from 1941 through 30 October 2019 explored the PubMed and Cochrane Library databases. Inclusion criteria: studies who investigated the reliability, the accuracy in predicting HF diagnosis and death or re-hospitalization of the IJV, IVC diameter, IVC collapsibility index (IVC-c = IVC max – IVC min / IVC max X 100) and Common Carotid US measures in adult (>18 yrs) with HF. Five researchers selected studies using inclusion criteria and then assessed their quality using the QUADAS-2 guidelines. The key words for literature search were: common carotid, internal jugular veins, inferior vena cava, ultrasonography and heart failure.

Results:
We collected 744 studies: 727 excluded with reasons, 18 studies were included for the final analysis: 4 on IJV, 13 on IVC, 1 on Carotid US. A IJV ratio < 4 predicts death and readmission: HR=2.7-10. A IVC ≥2 cm and IVC-c ≤15% showed an high accuracy in HF diagnosis and a moderate validity in predicting death and re-admission: AUC=0.63-0.78; HR=1.1-5.8 for IVC; AUC=0.63-0.74, HR=0.7-6.8 for IVC-c. The LVET (time interval between end diastole and the dicrotic notch of Common carotid artery Doppler waveform showed a good validity in predicting HF diagnosis: AUC=0.81 (95% CI, 0.72–0.87).The studies collected showed a moderate quality according to QUADAS-2 guidelines.

Conclusion:
Because few reports have been published on this topic the conclusions of this review should be confirmed. The IJV and IVC ultrasound measures seem to have a moderate accuracy in predicting diagnosis, death and hospitalization in patients with Heart Failure.