"…changes produced within the inferior vena cava (IVC) during respiratory movements and identify their possible clinical implications." Laborda et al (2014).

Reference:

Laborda, A., Sierre, S., Malvè, M., Blas, I.D., Ioakeim, I., Kuo, W.T. and Gregorio, M.A. (2014) Influence of breathing movements and Valsalva maneuver on vena caval dynamics. World Journal of Radiology. 6(10), p.833-9.

The effect of Valsalva maneuver on vena caval dynamics http://ctt.ec/M6sgy+ @ivteam #ivteam

Click To Tweet

Abstract:

AIM: To study changes produced within the inferior vena cava (IVC) during respiratory movements and identify their possible clinical implications.

METHODS: This study included 100 patients (46 women; 54 men) over 18 years of age who required an abdominal computed tomography (CT) and central venous access. IVC cross-sectional areas were measured on CT scans at three levels, suprarenal (SR), juxtarenal (JR) and infrarenal (IR), during neutral breathing and again during the Valsalva maneuver. All patients were instructed on how to perform a correct Valsalva maneuver. In order to reduce the total radiation dose in our patients, low-dose CT protocols were used in all patients. The venous blood pressure (systolic, diastolic and mean) was invasively measured at the same three levels with neutral breathing and the Valsalva maneuver during venous port implantation. From CT scans, three-dimensional models of the IVC were constructed and a collapsibility index was calculated for each patient. These data were then correlated with venous pressures and cross-sectional areas.

RESULTS: The mean patient age was 51.64 ± 12.01 years. The areas of the ellipse in neutral breathing were 394.49 ± 85.83 (SR), 380.10 ± 74.55 (JR), and 342.72 ± 49.77 mm(2) (IR), and 87.46 ± 18.35 (SR), 92.64 ± 15.36 (JR) and 70.05 ± 9.64 mm(2) (IR) during the Valsalva (Ps < 0.001). There was a correlation between areas in neutral breathing and in the Valsalva maneuver (P < 0.05 in all areas). Large areas decreased more than smaller areas. The collapsibility indices were 0.49 ± 0.06 (SR), 0.50 ± 0.04 (JR) and 0.50 ± 0.04 (IR), with no significant differences in any region. Reconstructed three-dimensional models showed a flattening of the IVC during Valsalva, adopting an ellipsoid cross-sectional shape. The mean pressures with neutral breathing were 9.44 ± 1.78 (SR), 9.40 ± 1.44 (JR) and 8.84 ± 1.03 mmHg (IR), and 81.08 ± 21.82 (SR), 79.88 ± 19.01 (JR) and 74.04 ± 16.56 mmHg (IR) during Valsalva ($Ps < 0.001$). There was a negative correlation between cross-sectional caval area and venous blood pressure, but this was not statistically significant in any of the cases. There was a significant correlation between diastolic and mean pressures measured during neutral breathing and in Valsalva.

CONCLUSION: Respiratory movements have a major influence on IVC dynamics. The increase in intracaval pressure during Valsalva results in a significant decrease in the IVC cross-sectional area.

Full text

Thank you to our partners for supporting IVTEAM