

THE IMPACT OF VARIOUS MANEUVERS ON VISUALIZATION OF INTERNAL JUGULAR VEIN

Authors: D. Gineityte¹, G. Kezyte¹,

Scientific research supervisor: S. Judickas^{1,2}, M. Serpytis^{1,2}

¹Vilnius University, Faculty of Medicine, Vilnius, Lithuania

²Center of Anesthesia, Intensive Care and Pain Management, Vilnius University Hospital Santariskiu Clinics, Vilnius, Lithuania

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Introduction. Internal jugular vein is one of the top sites for central venous access in critical care. Ultrasound guided technique is a “gold standard” for catheterization despite of that sometimes it is still performed according only to anatomical landmarks. Larger cross-sectional area (CSA) of internal jugular vein (IJV) increases chances of successful catheterization.

Aim. The aim of this study was to identify maneuvers that give the highest increase in cross-sectional area of internal jugular veins.

Methods and results. A prospective study of 63 healthy volunteers took place from 2014 11 06 to 2015 01 21. Two-dimensional ultrasound images of right IJV (RIJV) and left IJV (LIJV) were recorded at the level of the cricoid cartilage in a supine position both - with head in neutral position and 30-degree rotation during resting inspiration hold, hold of deep breath, resting and forced expiration hold, abdominal compression of 10 kg, 30-degree bed head elevation, 45-degree leg lift and 10-degree Trendelenburg position. The CSA was measured on still images.

Mean CSA of RIJV and LIJV were $0,78\pm 0,51$ cm² and $0,49\pm 0,31$ cm², respectively ($p<0,001$) in supine position with head in neutral position. The CSA of RIJV and LIJV in a neutral position of head increased during deep breath ($p<0,001$ both), 45-degree leg lift ($p=0,016$, $p<0,001$ respectively) and Trendelenburg position ($p<0,001$ both) vs. no maneuvers. Abdominal compression of 10 kg showed increased CSA only in LIJV ($p=0,008$). Rotation

of head by 30 degrees gave significant differences in both RIJV and LIJV during deep breath (both $p < 0,001$), and Trendelenburg position (both $p < 0,001$) vs no maneuvers. The 45-degree leg lift increased the CSA only in RIJV ($p = 0,024$).

Conclusions. The mean CSA of RIJV is significantly larger, although both the RIJV and the LIJV are prone to CSA enlargement during deep breath, 45-degree leg lift, 10-degree Trendelenburg position even with a greater extent when head rotation of 30-degrees is achieved, thus these maneuvers can be used to facilitate IJV catheterization using both - ultrasound guided or anatomical landmark technique.