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To the Editor,

Internal jugular vein location and sono-anatomy

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We read with great interest the recent published manuscript "Internal jugular vein location and anatomy on ultrasound" by Botermans and colleagues. They reported on 48 patients who received a central venous catheter in the internal jugular vein under ultrasound guidance. The aim of their study was to detect differences between subpopulations, find a relationship between measured parameters and ease of catheterization, and rate of complications. Although the studied population was too small to reach statistical significance, the authors stated that an increased frequency of complications was seen when: a) the left internal jugular vein was cannulated; b) smaller veins were used; c) the internal jugular veins tended to overlap with the internal carotid artery; and d) that a more anteriorly located internal jugular vein yielded to an increased risk of complications.

After a thorough reading of the manuscript, we still have some questions regarding the methodology and final conclusions. Why did the authors not perform power calculations for the study, to obtain valid conclusions with statistical support? All patients received a central venous access for reasons other than vital sign monitoring. All cannulations were performed under standardized circumstances by experienced and less experienced practitioners. However, it is unclear if all or some of the procedures were performed in awake or anesthetized patients and which manoeuvers were used to enlarge the diameter of the internal jugular vein (e.g. Trendelenburg position, Valsalva maneuver, distal compression of the vein, positive end-expiratory pressure ventilation). It is of importance to interpret results of the jugular vein diameter or cross sectional areas as positive airway pressure and PEEP have a major impact on the cross sectional area (1,2). How was the degree of Trendelenburg measured in order to perform a standardized cannulation? Even small degree changes may have a major impact on the cross sectional area of the internal jugular vein (3).

Measurements were performed at the level of the cricoid. What is the reason to measure at this point? The diameter of the jugular vein is not necessarily the largest at the level of the cricoid and probably not the largest if you measure the contralateral internal jugular vein. The optimal level of puncturing the jugular vein is at the level with the largest diameter (and when the internal jugular vein is completely lateral or medial to the carotid artery) in order to improve success and decrease complication rate (4). Therefore, the ideal puncture site should be determined along the entire pathway of the jugular vein (5).

The authors stated in their conclusion that the right-sided internal jugular vein should be preferred over the left one. Indeed, there are good reasons to choose the right-sided internal jugular vein: a) operators are used to cannulate the right sided internal jugular vein; b) they are more experienced and therefore the chance of having complications is lower; and c) the right-sided internal jugular runs more superficially compared to the left internal jugular vein and therefore is theoretically easier to cannulate (6). Some reports have compared right versus left internal jugular vein cannulation and found a higher incidence of complications (6,7). However, one should be aware that in over 25%

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of patients, the left jugular vein is dominant over the right one. Therefore, both internal jugular veins must be measured before cannulation (8). In the latter study on 151 patients, statistically significant differences were found between the right and the left internal jugular vein with median diameters (16.1 vs 13.7 mm), cross sectional area (144 vs 94 mm^2) with similar depths of the vessel from skin to the internal jugular vein (11.0 vs 11.1 mm). Seventy-two percent had a dominant jugular vein on the right side. Significant overlap of the internal jugular vein was seen in the majority of cases, both on the right and the left side, with the anatomical relationship of the vein and the carotid artery in the anterior position (5.4% vs 15.1%), and the anterolateral position (50.7% vs 50.1%). Lateral positions were seen in 43.9% and 33.8%, respectively. There were no differences in diameter, cross-sectional area and depth of the carotid artery between right and left side.

We agree with the authors to always use ultrasound guidance during central line placing in a non-emergency setting as it increases success and decreases the complication rate. Furthermore, we are convinced that ultrasound for central venous access should always be used even in emergency settings.

References

1. Zhou Q., Xiao W., An E., Zhou H. and Yan M. 2012. Effects of four different positive airway pressures on right internal jugular vein catheterisation. Eur. J. Anaesthesiol. 29 : 223-228.
2. Lee S.C., Han S.S., Shin S.Y., Lim Y.J., Kim J.T. and Kim Y.H. 2012. Relationship between positive end-expiratory pressure and internal jugular vein cross-sectional area. Acta Anaesthesiol. Scand. 56 : 840-845.
3. Marcus H.E., Bonkat E., Dagtekin O., Schier R., Petzke F., Wipperman J., Böttiger B.W. and Teschendorf P. 2010. The impact of Trendelenburg position and positive end-expiratory pressure on the internal jugular cross-sectional area. Anesth. Analg. 111 : 432-436.
4. Mey U., Glasmacher A., Hahn C., Gorschlüter M., Ziske C. and Mergelsberg M. 2003. Evaluation of an ultrasound-guided technique for central venous access via the internal jugular vein in 493 patients. Supportive Care Cancer, 11 : 148-155.
5. Maecken T., Marcon C., Bomas S., Zenz M. and Grau T. 2011. Relationship of the internal jugular vein to the common carotid artery: implications for ultrasound-guided vascular access. Eur. J. Anaesthesiol. 28 : 351-355.
6. Ishizuka M., Nagata H., Takagi K. and Kubota K. 2010. Right internal jugular vein is recommended for central venous catheterizatio., J. Invest. Surg. 23 : 110-114.
7. Sulek C.A., Blas M.L. and Lobato E.B. 2000. A randomized study of left versus right internal jugular vein cannulation in adults. J. Clin. Anesth. 12 : 142-145.
8. Bos M.J., van Loon R.F.H.J., Heywood L., Morse M.P. and van Zundert A.A.J. 2016. Comparison of the diameter, cross-sectional area, and position of the left and right internal jugular vein and carotid artery in adults using ultrasound. J. Clin. Anesth. 32 : 65-69.