

To the Editor,

In response to Internal jugular vein location and sono-anatomy

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We like to thank colleagues Bos and Van Zundert for reading our paper with interest and opening up the possibility of a compelling debate (1).

We fully agree with the authors of the letter on the statistical part of their criticism, we did however perform a power analysis. Unfortunately the main researcher at that time, Dr Botermans, stopped his training at the department of anesthesiology. He joined the department of Clinical Pharmacology and Pharmacotherapy to become full time investigator and we fell short of our goals. We still think it was worth to publish the work we already had, because of the significant trend seen in our research.

We also agree with the authors that even small changes in Trendelenburg have a major impact on cross sectional area of veins. Unfortunately we failed to clearly add the standardized protocol used in our paper. We used Eleganza 3 beds (Linnet, 10420-R Harris Oaks Blvd | Charlotte, NC 28269) which provide a preset Trendelenburg position. We used an easy to use Iphone Carpenter app (ihandy apps, Version 1.7.03.1 iHandySoft Inc.) to control the correct angle. All 48 patients had approximately 15° degrees Trendelenburg. (With a mean variation of 0,5 degrees at most).

Breathing, Valsalva and even the rotation of the head can indeed have an important impact on cross sectional area (2). For this purpose we also measured the rotational angle of the neck using the tool described above. We did not ask the patients for a Valsalva maneuver. Last but not least, the handling of an ultrasound probe is also a very significant factor in the measurement of cross sectional areas. The slightest amount of pressure of the linear transducer indents the tissue above the Internal Jugular Vein (IJV) and can produce quite different figures. We used minimal pressure and did not make cross sectional pictures when the IJV had a triangular shape or showed a flattened front wall. High probe pressure could also explain why posterior wall penetration is extremely high in ultrasound guided central venous cannulation (3).

They also point out, quite correctly, that we failed to detail the status of our patients (awake,

under GA, sedated). All 48 patients who were included, were awake patients in need of central venous cannulation for one of several reasons, namely total parenteral nutrition, prolonged antibiotic use, or difficult vascular access and need for hydration. At the department of Anesthesiology in the University Hospitals of Leuven, Belgium we perform roughly about 400 central venous catheters in awake patients per year. Approximately 2500 others are placed under general anesthesia. Most of the latter ones are still cannulated using landmark techniques. In a brief pilot project where we looked at the exact level of placement of the landmark central line cannulations. We found that they were all placed at the point of the cricoid give or take +/- 0,7 cm. (checked with ultrasound) This is also consistent with an approach that has been advocated before and that we feel is safe to use (4).

We do agree that the IJV should always be screened along the entire pathway left and right to make a decision.

However we do not agree that the ideal level to puncture should be decided on the basis of the biggest cross sectional diameter or on the basis of where the IJV is most lateral. If the biggest cross sectional diameter would be just submandibular the needle angle would be much too steep. If the biggest cross sectional diameter is just one centimeter above the clavicle the chances of pneumothorax or

In reaction to : M.J. BOS, A.A.J. VAN ZUNDERT. 2018. Internal jugular vein location and anatomy on ultrasound. *Acta Anaesthesiol. Belg.* 69 : 99-106.

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Funding: none

Conflict of interest: none

even worse, atrial lacerations become much higher (5). Screening the entire pathway is also important in regards to changes in cross-sectional diameter. Using the biggest diameter distal of a more narrow IJV could make needling easier, but not necessarily make wiring more effortless.

As both a national and international expert in regional anesthesia and ultrasound guided peripheral nerve blocks, I also must warn for the decreased interest in anatomical landmarks and knowledge. Although we still stand by our conclusion that we should use ultrasound for every central line attempt, we also believe that ultrasound does not obviate the need for anatomical insight.

Anatomical landmarks remain necessary and even the basis for orientation of both needling techniques and handling of the ultrasound probe itself (6).

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