Cardiac Output Measurements in Young Children: Comment

To the Editor:

Sigurdsson *et al.* conducted and reported a superb investigation examining measurement of cardiac output in small children by extracorporeal arteriovenous ultrasonography with reference to an aortic flow probe.[1] I note that they measured five consecutive repeated cardiac output measurements simultaneously by both methods in subjects (n = 43) and appear to use all of the data points (215) to measure bias and limits of agreement using standard Bland–Altman analysis.[2] Since their original paper in 1986, Bland and Altman have detailed special considerations for repeated measures from the same subjects and warned that "if each pair of X and Y measurements is treated as if from a different individual the structure of the data is ignored and incorrect estimates are likely; specifically, the interval between the limits of agreement may be too narrow."[3] Bland and Altman developed specific techniques for repeated measures in the same subject with the exact statistical method dependent on whether the physiologic variable (*e.g.,* cardiac output) is changing or not. Myles and Cui expanded on this technique and offered additional methods to overcome violation of the assumption of independent sampling that occurs when all repeated measures are treated as if they are from different individuals.[4] I wonder if it would be possible for the authors to use the more modern Bland–Altman analysis for their data and provide updated results that remain consistent with statistical assumptions of independent sampling.

Competing Interests

The author declares no competing interests.

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Cardiac Output Measurements in Young Children: Reply

In Reply:

We are thankful for Dr. Morey's excellent comments regarding possible inaccurate estimates in limits of agreement related to repeated measurements in the same subject with regards of our recent paper.[1]

This issue was raised during statistical revision of the paper, where we first presented our results with a Bland–Altman analysis using mean cardiac output values for both methods in all 43 subjects (resulting in only 43 x–y pairs for comparison). As recommended by the statistical reviewer, this was corrected to a Bland–Altman analysis of each repeated measurement (using all 215 x–y pairs), assuming a nonconstant change in cardiac output. This correction did not have any remarkable effect on the limits of agreement (0.41 to –0.24 for 43 x–y pairs and 0.40 to –0.24 for 215 x–y pairs). We then tried to apply the recommended modified Bland–Altman method for repeated measurements[2] but for some reason were not able to reach assumed estimates. Instead we used the approach recommended by Zou to estimate limits of agreement[3] and found that it was in agreement with our previous limits of agreement estimations (0.40 to –0.25 using Zou's method for 215 x–y pairs). We had not seen the paper by Myles and Cui[4] expanding on the modified Bland–Altman method.

Although it is important to be aware of possible changes in limits of agreement regarding Bland–Altman analysis

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and repeated measurements in the same subject, we did not notice any relevant change in limits of agreement when Zou's method was applied to our data. Estimated bias, precision, and percentage error in our paper should not be affected by any changes in the limits of agreement due to possible fluctuations in cardiac output between measurements.

Competing Interests

The author declares no competing interests.

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Postlaryngectomy Stoma *versus* Tracheostomy: Comment

To the Editor:

Truong and Truong have brought forth some important aspects of general anesthesia using a stoma of a patient after total laryngectomy.[1] However, a few simple questions arise. Regarding *nil per os* status for general anesthesia of a patient after total laryngectomy with a mature stoma, risk of pulmonary aspiration does not cease to exist because as high as 65% of the patients may develop a fistula between pharynx/esophagus and trachea/bronchus or skin around stoma.[2,3] Moreover, because there are only a few contraindications to primary or secondary tracheoesophageal puncture with one-way-valve voice prosthesis, tracheoesophageal puncture is performed as the gold standard procedure for voice rehabilitation in 84% of the total laryngectomy patients.[4,5] However, the seal of the one-way valve can be imperfect, and aspiration potentially occurs through or around the one-way valve.[2] Therefore, for general anesthesia of a patient after total laryngectomy, *nil per os* is indicated when assuming that a conduit may exist allowing gastric contents to get access to the lungs; preoperative clinical assessment may be unreliable and investigations (videofluoroscopy, fiber-optic endoscopic evaluation of swallowing, manometry, and videomanofluorography) may not be immediately possible to rule out these unwanted conduits.[2,3] Assuming that aspiration risk across these unwanted conduits decreases with *nil per os*, a suitable mask (neonatal/infant size) can be used for short periods of emergent and even elective positive pressure ventilation without intubating stoma. As inspired by the National Tracheostomy Safety Project,[6] this is schematically shown in figure 1. Moreover, spontaneous mask breathing through the stoma can ensure optimal preoxygention and ventilation. Of course, the care team must be cautious, and the pressure applied on the mask has to be high enough to ensure adequate mask seal but not too high to cause the compromise of the airway patency of the stoma and/or the segment of the trachea under the mask.

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The author declares no competing interests.

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