NEUROVASCULAR RESPONSES TO SEQUENTIAL DEEP INSPIRATIONS ASSESSED VIA LASER-DOPPLER PERFUSION CHANGES IN DORSAL FINGER SKIN

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METHODS

SUBJECTS: Twenty-eight volunteers (14 males) were studied. Subjects had no history of cardiovascular or inspiratory abnormalities.

PROCEDURES: Subjects sat in a height adjustable chair with heads placed palm down on a support surface. A laser-Doppler probe was placed over the volar aspect of the index finger at the proximal palmar crease. A thermocouple was placed over the probe and the room temperature was monitored. An inspiration was simulated by firmly sucking negative pressure through the mouth, the inspiratory gasp was then held for 5 sec and the breath expired (Figure 4). This cycle was then repeated at 1-2 min intervals. Testing began when a steady state was achieved and was completed in 20 min. Skin and room temperatures were continuously monitored. After the test, blood pressure was measured and all raw SBF data was downloaded and averaged across subjects.

RESULTS

Example of Overall SD Using Triplet Sample-Sets

The entire sample set is divided into 2 sets. For each of the 12 sets, the SD and percentage change are calculated. The sample size for each set is 20 minutes, and the SD is calculated by subtracting the baseline SBF value from all raw SBF data prior to analyses.

The analyses provide a framework for, and specific estimates of, the number of subjects needed to detect specified IGVR differences between groups or changes in IGVR after such interventions. 7. Application of these findings to results reported in the literature provided a basis for the conclusions drawn concerning lack of statistical underpowering.

CONCLUSIONS

1. In this group of 28 healthy subjects the overall mean perfusion decrease induced by 21 sequential inspiratory gasps and measured at the finger dorsum was 72.3% of each response immediately preceding five-minute baseline blood perfusion.

2. This magnitude of IGVR was not reported for those obtained at finger palmer surface 10 or 20 minutes post-inspiration. This suggests that the magnitude of the IGVR is not dependent on the site of measurement.

3. Variability of the IGVR, both within and across subjects, is affected by several factors, one of which is sample-set size. This magnitude of IGVR is comparable to values reported for those obtained at finger palmar surface 10 or 20 minutes post-inspiration. This suggests that the magnitude of the IGVR is not dependent on the site of measurement.

4. The ability to statistically detect differences in IGVR between normal subjects and patients with suspected neurovascular defects that depend on the number of IGVR samples used to characterize the mean response and on the number of subjects N.

5. Similarly, the ability to detect acute changes in IGVR, potentially associated with effects of rapidly acting therapeutic interventions that modify IGVR, depends on the SD sample-set size, the correlation between IG sample-set variances and N.

6. The analysis provides a framework for, and specific estimates of, the number of subjects needed to detect specified IGVR differences between groups or changes in IGVR after such interventions.

7. Application of these findings to results reported in the literature provided a basis for the conclusions drawn concerning lack of statistical underpowering.