**SUPPLEMENTAL DIGITAL CONTENT 3**

*Sample Size Calculation*

We based our study power analysis on preliminary data from a small series of 6 consecutive standard size 8mm ETTs removed from patients intubated for more than 48 hours and scanned with standard-resolution Computed Tomography. In that early work by Thomas et al.1, in order to enhance the sensitivity of the technique, tubes were first prepared by pouring a small amount of zinc dust in the lumen. Digital images were then obtained (0.5mm slices) and analyzed through an Automated Vessel Measurement application (Vital-U®, Vital Images, Minnetonka, MN). The average calculated volume of air inside the scanned 8.0 mm ETT was 10.36 ± 1.15 ml.

However, given the poor amount of preliminary data, the novelty of the technique, and the expected heterogeneity of the study population, we first assumed an *a priori* volume variability at CT-scan of ± 3 standard deviations, within the 95% confidence interval of our preliminary dataset (0.6-7.24).

The primary endpoint of the study was to assess the difference in terms of ETT occlusion between the two groups. We hypothesized an average 2 ± 1 ml less mucus, as an effect of the cleaning device in the treatment arm, consistent with the estimation reported by our group in published work2.

We calculated that 74 patients (37 for each group) should be enrolled to detect this difference for a statistical power of 80% with a two-sided significance level of 0.05 in a two-sample t-test for mean difference.

**REFERENCES**

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2. Berra L, Coppadoro A, Bittner EA, et al. A clinical assessment of the Mucus Shaver. Critical Care Medicine 2012;40(1):119–124.