

## Determination of a Conversion Factor To Permit Accurate Transoral Placement of the BRAVO pH Capsule Following Transnasal Manometry

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**Background:** The BRAVO pH capsule system (Medtronic, Minneapolis) requires either transnasal placement of the capsule 5 cm above the manometrically determined upper border of the lower esophageal sphincter (LES), or transoral placement 6 cm above the endoscopically determined gastroesophageal junction (z-line). Transnasal passage frequently produces epistaxis. An upper endoscopy has been recommended prior to transoral passage and placement of the capsule. To permit transoral passage of the capsule after transnasal manometry in an open access GI Motility Lab, a conversion factor is needed to account for the difference in distance from the nose or mouth to the distal esophagus.

**Methods:** We performed tandem transnasal and transoral manometry and transnasal and transoral endoscopy in consecutive volunteers. Following topical anesthesia of the nose and throat, transnasal and transoral esophageal manometry studies were performed using a solid state 4 transducer catheter. The studies identified the distance to the upper border of the LES using station pull-through technique. Unsedated transnasal and transoral endoscopies were performed following topical anesthesia to the nose and throat. A 4mm flexible esophagoscope (Olympus, Melville, NY) was passed and the distance to the z-line was ascertained. Data were recorded for gender, age, height, weight, BMI, esophageal symptoms, adverse events, and findings. **Results:** 25 patients (15F/10M), with mean age 38 (range 24-60) consented to and underwent the above procedures. The mean  $\pm$  SD transnasal manometry (TNM) distance (in cm) to LES was  $43.4 \pm 3.4$ , while the distance transorally (TOM) was  $39.4 \pm 3.4$ . Endoscopically the mean  $\pm$  SD distance to the z-line (in cm) was  $43.8 \pm 3.1$  transnasally (TNE) and  $40.5 \pm 2.9$  transorally (TOE). The difference of TNM/TNE

was 1.2 cm reflecting the length of the LES above the z-line. The mean standard difference of TNM/TOM was  $4.1 \pm 0.4$ cm (range 3-5). For TNE/TOE it was  $3.3 \pm 0.5$ cm (range 2.5-4). No TNM/TOM length measurement differences were seen in relationship to gender, age group, height or BMI. Conclusion: There is a conversion factor that can be employed at the time of transnasal esophageal manometry to allow transoral placement of the Bravo pH capsule at the recommended location. Subtracting 9 cm from the transnasal manometrically determined upper border of the LES will place the capsule at approximately 5 cm above the upper border of the LES and 6 cm above the z-line, without the need for a prior endoscopy.