Hiatal Hernia Size Predicts Abnormal pH Testing

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Introduction

- Hiatal hernia disrupts the anti-reflux barrier and contributes to GERD.
- Wireless BRAVO pH monitoring is commonly used for objective reflux evaluation.
- The relationship between hernia size and abnormal pH testing remains poorly defined.
- Understanding this relationship may improve preoperative diagnostic pathways.

Hypothesis

Increasing hiatal hernia size is associated with a higher likelihood of abnormal BRAVO pH testing.

Methods

- Retrospective cohort study of patients undergoing preoperative 96-hour wireless BRAVO monitoring (2009–2026)
- Patients identified from a prospectively maintained gastroesophageal database
- Inclusion: hiatal hernia identified on imaging or endoscopy
- Exclusion: prior hiatal hernia repair or incomplete pH data
- Abnormal reflux defined by Lyon Consensus criteria (AET ≥6% on ≥2 days)

Statistical Analysis

- Comparison of BRAVO results across hernia size strata
- Correlation with DeMeester score and AET%
- Multivariable logistic regression to identify predictors of abnormal BRAVO
- Sensitivity and specificity analysis of hernia size thresholds

Results

- A total of 363 patients met inclusion criteria. The mean age was 60 ± 14 years, 65.8% were female, and the median hiatal hernia size was 2.5 cm. Overall, 79.3% (288/363) of patients demonstrated abnormal BRAVO testing.
- The prevalence of abnormal BRAVO increased progressively with hiatal hernia size (p = 0.002, Figure 1). Abnormal studies were observed in 60.0% of patients with hernias <1 cm, 66.7% with 1–1.9 cm, 77.7% with 2–2.9 cm, 87.7% with 3–3.9 cm, 90.2% with 4–4.9 cm, and 95.2% with 5–5.9 cm. In contrast, abnormal BRAVO prevalence decreased to 68.4% among patients with hernias ≥6 cm.
- Increasing hiatal hernia size was also associated with greater reflux severity. Both acid exposure time (AET%) and DeMeester score increased across hernia size strata, with attenuation in the ≥6 cm group.
- In multivariable analysis, hiatal hernia size remained independently associated with abnormal BRAVO. Compared with hernias <1 cm, adjusted odds ratios increased from 3.71 for 2–2.9 cm hernias to 17.44 for 5–5.9 cm hernias.
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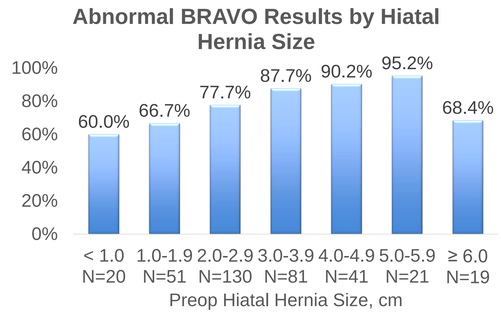
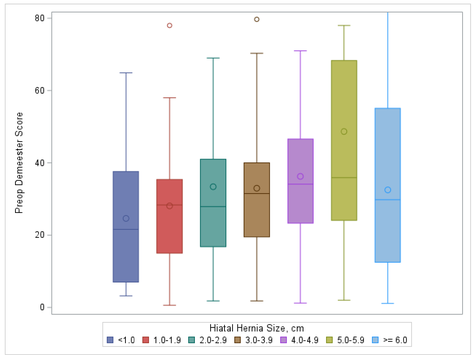


Figure 1. BRAVO positivity rates for patients by HH size

Conclusion

- Hiatal hernia size demonstrates a graded association with abnormal BRAVO pH testing.
- Intermediate-to-large sliding hernias (3–5.9 cm) show the highest prevalence of abnormal reflux.
- Hernia size ≥5 cm demonstrates high specificity for abnormal reflux.
- Larger paraesophageal hernias may represent a distinct physiologic phenotype with less acid-driven symptoms.

Results



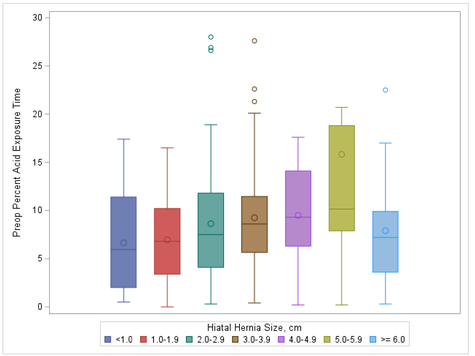


Figure 2. Preoperative DeMeester scores (top) and AET% (bottom) sorted by patient HH size