

Natural, physiological changes in DCI for Multiple Rapid Swallows (MRS) and Apple Viscous Swallows (AVS) call for expansion in protocol for hypercontractility and ineffective esophageal motility.

Patients who met elevated IRP criteria in two or more swallow tests were more likely to have true EGJOO than those who only met elevated IRP in Wet Swallows (WS). There is a need to update the criteria for EGJOO.

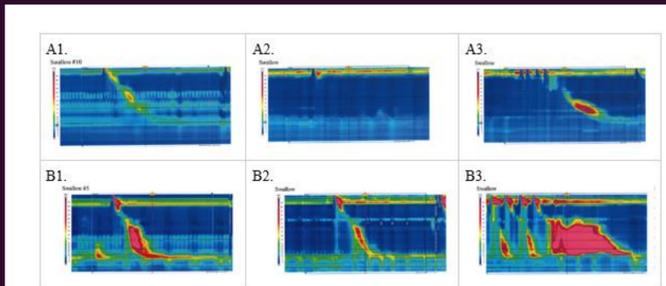


Figure 1. Findings of wet swallow (1), apple viscous (2), and multiple rapid swallow (3) tests performed on two different patients (A and B). A1. Weak contraction seen on wet swallow. A2. Failed swallow seen on AVS. A3. Patient able to augment contraction on MRS. B1. No major abnormality seen on wet swallow. B2. No major abnormality seen on AVS. B3. Marked hypercontractile esophagus and loss of deglutitive inhibition on MRS.

Discussion Questions:

1. Because DCI increases with MRS due to physiological augmentation, is doubling of MRS DCI compared to WS DCI a possible additional measure for hypercontractility in cases of unclear jackhammer-like symptoms?
2. Because AVS naturally produces a lower DCI, should 70% rather than 50% be the cut-off for ineffective swallows for accurate diagnosis of ineffective esophageal motility?
3. Along with elevated IRP in WS, should elevated IRP in AVS (>12 mmHg) or in MRS (>8 mmHg) be included in protocol to confirm a diagnosis of EGJOO?



A Parametric Comparison Among Wet Swallows, Viscous Swallows, and Multiple Rapid Swallows: Enhancing Diagnostic Criteria for Hypercontractile Esophagus, IEM, and EGJOO

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Background

1. Over the last decade, **esophageal dysfunction has risen**
2. HRM is the **gold standard** for assessing esophageal motility disorders. It includes multiple provocative tests, such as Wet Swallows (WS), Apple Viscous Swallows (AVS), and Multiple Rapid Swallows (MRS).
3. There is a need for **increased diagnostic accuracy** for EGJOO and jackhammer to avoid additional unnecessary testing or treatment.
4. Few studies have conducted parametric comparison directly among these provocative maneuvers.

The goal of this study was to directly compare WS, AVS, and MRS to determine notable parametric differences in testing and identify gaps in current protocol that might advance diagnosis.

Methods

1. This is a mixed retrospective study of 100 patients. 70 patients completed the entire protocol: supine WS, upright AVS, and upright MRS.
2. The study was conducted at a tertiary academic center in Upstate, New York.
3. The patients had one or more of the following esophageal indicators: dysphagia, reflux, chest pain, and preoperative assessment.
4. Patients were further classified by their Chicago Classification (CC). There were 32 patients with Normal CC and 22 patients with EGJOO CC.
5. The following provocative measures were analyzed: Mean DCI, Maximum DCI, Median IRP, Distal Latency, Incomplete Bolus Transit.
Incomplete bolus transit: incomplete impedance clearance ($\geq 20\%$ for WS; $\geq 30\%$ for AVS; $\geq 50\%$ for MRS).
6. For the EGJOO subset, IRP metrics were compared for agreement. EGJOO IRP criteria: >15 mmHg for WS, <12 mmHg for AVS, >8 mmHg for MRS.
7. Statistical analyses were conducted to measure statistical significance and variance among tests.

Results

Results compared to those of WS data:

- A. Mean DCI : 61% increase for MRS; 41% decrease for AVS.
- B. Maximum DCI: 41% increase for MRS; 40% decrease of AVS.
- C. IRP: 60% decrease for MRS; 39% decrease for AVS.
- D. No significant differences in distal latency.

Results from the EGJOO subset analysis:

- A. 55% of patients (12 patients) had EGJOO and met 2 or more of the IRP criteria according to CC.
- B. 45% of patients (10 patients) had artifact EGJOO and only met the WS IRP criteria.

Noteworthy observations:

- A. For 6% of patients (4 patients), AVS was beneficial in detecting severe hypokinetic disorders that were missed by MRS and WS.
- B. For 19% of patients (13 patients), MRS was beneficial in detecting hypercontractile esophagus that was missed by AVS and WS.

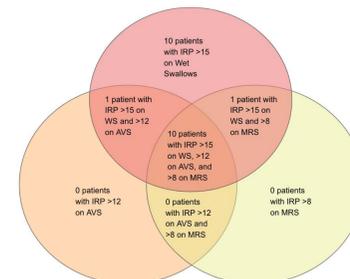


Figure 2. Tri-Venn diagram demonstrating overlap of EGJOO patients with IRP >15mmHg on wet swallows, >12mmHg on apple viscous swallows, and >8mmHg on multiple rapid swallows.

Table 1. Comparative Analysis of Mean DCI, Max. DCI, Median IRP, Distal Latency, and Incomplete Bolus Clearance for WS, MRS, and AVS (n=70)

Variable Measure	Average for Wet Swallows (supine)	Average for AVS (upright)	Average for MRS (upright)	Statistic Metric (F or t value)	p-value	Significant (p<0.05)
Mean DCI	2832.6	1685.2	4572.8	5.1	0.007	Yes
Max DCI	4322.0	2584.3	6082.0	4.6	0.012	Yes
Median IRP	15.7	9.65	6.0	11.5	0.000019	Yes
Distal Latency	7.2	7.1	---	t(131) = -0.18	0.85	No
Incomplete Bolus Clearance (%)	19	20.8	24.9	0.97	0.379	No