



# Integrated Relaxation Pressure During Swallowing: An Ever-changing Metric

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**Article:** Alteration in integrated relaxation pressure during successive swallows in subjects with normal manometry versus those with esophagogastric junction outflow obstruction

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High-resolution esophageal manometry (HREM) enables the comprehensive evaluation of esophageal motor functions based on esophageal pressure topography plots. The Chicago classification for esophageal motor disorders is widely accepted as a standard; it provides an algorithmic approach to diagnosis that is prioritized in a hierarchical fashion.<sup>1,2</sup> The key metrics in the Chicago classification include the integrated relaxation pressure (IRP), distal contractile integral, and distal latency. Among these, the IRP is the fundamental HREM metric for assessing the adequacy of relaxation at the esophagogastric junction (EGJ) during swallowing.

The IRP is defined as the average lowest pressure through the EGJ for 4 contiguous or non-contiguous seconds within the 10-second window following deglutitive upper esophageal sphincter relaxation.<sup>3,4</sup> Currently, to decrease the effect of outliers, the median IRP, obtained from ten 5 mL swallows, is utilized for the interpretation. Although the IRP is validated metric in differentiating intact from impaired EGJ relaxation, the normative values differ according to the position, measurement system, or software used in the analysis.<sup>5,6</sup>

In this issue of the *Journal of Neurogastroenterology and Motility*, a study by Elangovan et al<sup>7</sup> investigating the durability of the

IRP during successive swallows in the supine position has been published. A total of 70 patients with normal manometry and 31 patients with EGJ outflow obstruction (EGJOO) were included in the analyses; ten 5 mL water swallows were performed using a solid-state system, and the changes in the mean IRP were estimated by comparing the IRP value of each swallow to that of the first swallow. In patients with normal manometry, the mean IRP of the last swallow was 40% lower than that of the first swallow (8.84 vs 5.29,  $P = 0.015$ ). Similarly, the mean IRP value of the last swallow was 19% lower than that of the first swallow in patients with EGJOO (25.84 vs 20.95,  $P = 0.018$ ). The mean difference between the first and last swallows was not significantly different between the 2 groups. In addition, based on the presence of symptoms, the decline in the IRP between the first and the last swallows was not significantly different.

Accurate assessment of the IRP is important because the failure to detect impaired EGJ relaxation would result in an alternative diagnosis. However, the IRP is a complex metric that is influenced by lower esophageal sphincter relaxation, crural diaphragm contraction, and intrabulbus pressure in the post-deglutitive period. In addition, swallow-induced peristalsis with contraction of the lon-

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gitudinal muscle was associated with an average of 2 cm proximal migration of the lower esophageal sphincter,<sup>8</sup> which could lead to a change in the position of the catheter during repeated swallowing. Thus, it may not be surprising that even during successive swallowing, there are variations in the IRP within individuals. In the above-mentioned study, a steady decline in the IRP was demonstrated during swallowing in subjects with normal manometry as well as in those with EGJOO. However, the absolute decrease in the IRP value was similar between patients with normal manometry and those with EGJOO (3.55 vs 4.89,  $P = 0.513$ ). The mean IRP of the first and the last swallows was within normal range in patients with normal manometry, and the IRP value of the last swallow was beyond the upper normal limit in patients with EGJOO, thus indicating that the final manometric diagnosis is less likely to change.

The recently proposed Chicago classification version 4.0 for esophageal motility disorders recommends the addition of change in posture and provocation test as a standardized protocol for HREM.<sup>2</sup> In addition, the importance of adjunctive testing and the presence of relevant symptoms is emphasized. The optimal protocol for performing HREM is evolving. However, it remains unchanged that the interpretation based on comprehensive information, not on a single metric, considering clinical features is the optimal method.

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