

BRIEF COMMUNICATION

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Critical analysis of hypercontractile waves vigor to define hypercontractile esophagus disease

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HIGHLIGHTS

- The current definition for hypercontractile esophagus was arbitrarily set at the uppermost range in volunteers for a specific equipment.
- 4000 mmHg.cm.s seems to be a more reasonable cutoff value.
- The lack of a gold standard test or symptoms prevent a perfect definition.

ABSTRACT – Background – The current definition for hypercontractile esophagus was arbitrarily set at the uppermost range in volunteers for a specific equipment. **Objective** – This study aims to critically analyze the concept of hypercontractile waves to redefine hypercontractile esophagus parameters. **Methods** – We reviewed 500 unselected and consecutive HRM tests (5000 waves) performed in a water-perfused system. **Results** – Mean distal contractility integral (DCI) was 825±1492 (0–42775) mmHg.cm.s, two standard deviations above average = 3810; 95th percentile = 2798 mmHg.cm.s. **Conclusion** – In healthy volunteers, two standard deviations above average is 4000 mmHg.cm.s, we thus suggest this value to define hypercontractile waves and define hypercontractile esophagus in a water-perfused HRM system.

Keywords – Esophageal motility disorders; hypercontractile esophagus; high resolution manometry; distal contractile integral.

The current definition for hypercontractile esophagus is >20% of hypercontractile waves that were arbitrarily set at the uppermost range in volunteers for a specific solid-state equipment⁽¹⁾, different from other parameters or even from the initial classifications, or during the conventional manometry era. Even though the panel of experts that compose the International High Resolution Manometry Working Group insist that different high-resolution

manometry (HRM) systems must have different reference values⁽²⁾, the cut-off of 8000 mmHg.cm.s for the distal contractility integral (DCI) was universally adopted⁽³⁾. Still based on the Chicago classification - that sets the bases for esophageal manometry performance and interpretation - symptoms cannot be used as a definition for hypercontractile esophagus since there is an overlap of manometric findings between symptomatic and asympto-

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matic individuals. Furthermore, there is not a second test that can be used as a gold-standard reference. These facts certainly prevent a perfect manometric definition for the disease. An arbitrary number; however, may not be adequate and a revised definition based on values distribution and a system different from the one originally used, may be more reasonable for water-perfused equipment users.

This study aims to critically analyze the concept of hypercontractile waves to redefine hypercontractile esophagus parameters.

We reviewed 500 unselected and consecutive HRM tests (5000 waves) performed in a 24-channel water-perfused catheter (Multiplex, Alacer Biomedica, São Paulo, Brazil). The reusable catheter is made of polyvinyl chloride (PVC) with 4.7 mm of diameter. Side holes are spaced 5 mm and 120° in a spiral disposition in the LES area and 2 cm apart elsewhere. The sensors encompass 34 cm in total. Tests followed previously described protocol without change in position or provocative tests⁽⁴⁾. Mean age was 46±15 (22–87) years, 54% males. Achalasia and poor-quality tests were excluded from analysis. DCI distribution-type analysis was carried out in order to evaluate the sampling behavior. Variables are presented as mean ± standard deviation (range).

Results show that Mean DCI was 825±1492 (0–42775) mmHg.cm.s, two standard deviations above average = 3810 mmHg.cm.s; median = 429 mmHg.cm.s; 95th percentile = 2798 mmHg.cm.s. FIGURE 1 shows DCI distribution for all individuals. TABLE 1 shows an analysis for the prevalence of waves for a range of values.

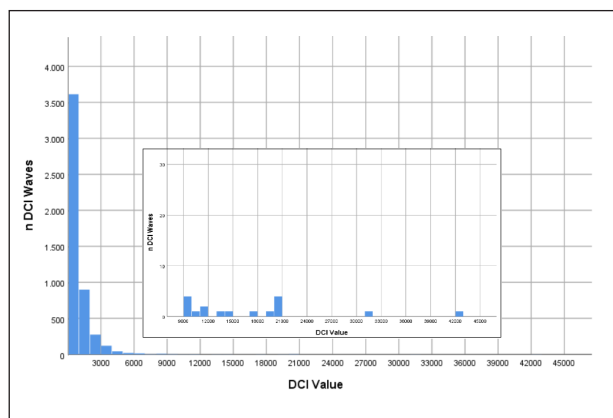


FIGURE 1. Histogram representing distal contractility integral (DCI) (mmHg-s-cm) distribution.

TABLE 1. Prevalence of waves for a range of distal contractility integral (DCI) values.

DCI (mmHg-s-cm)	Number (%) of waves	Number (%) of individuals	Number (%) of individuals ≥2 waves*
3000–4000	120 (2%)	53 (11%)	27 (5%)
4000–5000	42 (0.8%)	29 (6%)	9 (2%)
5000–8000	37 (0.7%)	16 (3%)	6 (1%)
8000–10000	11 (0.2%)	5 (1%)	3 (0.6%)
≥10000	13 (0.3%)	5 (1%)	2 (0.4%)

*Individuals with two or more waves within the range.

The 8000 value to define a hypercontractile esophagus is based on a low level of evidence^(3,5). Any attempt to review this value is limited by a lack of a gold standard parameter for comparison. Symptoms do not define the disease⁽³⁾ even though the number of patients with symptoms (dysphagia and/or chest pain) increased from 13% in patients with DCI 4000–8000 to 80% with DCI >8000. Provocative maneuvers during the HRM are not consensual even among the experts of the classification⁽³⁾. Barium swallow does not correlate with manometric findings⁽⁶⁾. Response to treatment is not useful since without a clear definition of disease, treatment would not be offered indistinctly. Our population was composed of a pool of patients referred to a busy motility center. This included a large number of diseases, indications, and findings. Most of the patients were seen only for esophageal function tests and detailed clinical information and the results of other tests were not available for the majority of patients. This is certainly a limitation of the study.

We tried, then, to analyze the distribution of DCI. The initial expectation was a bicausal scattering with a “silence” between the limit for normality and hypercontractile waves, but this was not noticed. If the 95th percentile (3000) is used, 5% of the individuals will fulfill the criteria for diagnosis, what is probably excessive. This will fall to two if the criteria of two standard deviations above average (4000) or the upper limit for volunteers (5000)⁽⁴⁾ are used. In healthy volunteers, two standard deviations above average are coincidentally 4000 according to our own results⁽⁴⁾ and those of a multicenter study in similar population and the same equipment⁽⁷⁾, we thus suggest this value to define hypercontractile

waves and define hypercontractile esophagus in a water-perfused HRM system.

Reference values cannot be simply imported from solid-state to water-perfused systems. Energy is lost in the water circuit since the sensors are located far from the patient and it is more sensitive to patient and equipment position. We believe that 4000 mmHg.cm.s is the most adequate cutoff value to define hypercontractile esophagus in the tested equipment. Clinical studies are welcome to support this finding.

The study was approved by the Ethics Committee under #74704623.7.0000.0087. Informed consent was waived due to the retrospective nature of the protocol.

Author's contribution

Zanini LYK: acquisition of data, analysis and interpretation of data, drafting the article, final approval of the version to be published. Herbella FAM: conception and design, acquisition of data, analysis and interpretation of data, drafting the article, final approval of the version to be published. Patti MG: analysis and interpretation of data, review for intellectual content, final approval of the version to be published.

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