

## RESEARCH ARTICLE

### High-resolution manometry in the diagnosis of diffuse esophageal spasm: A rare motility disorder

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Received: January 26, 2020; Accepted: February 26, 2020

#### ABSTRACT


**Background:** Diffuse esophageal spasm (DOS) is a rare motility disorder. High-resolution manometry (HRM) is used for the diagnosis of DOS in patients confirmed with non-cardiac chest pain and/or dysphagia. The body of the esophagus and the lower esophageal sphincter (LOS) exhibit various motility characteristics that are typical to DOS. The study was conducted to study the HRM patterns in DOS using a 16-channel water perfusion high-resolution esophageal manometer. **Aims and Objectives:** The objective of the study was to analyze the various motility patterns in DOS with the help of HRM and also to look for those patients who, at the time of the HRM recording, did not reveal overt patterns of motility that is typical to DOS. **Materials and Methods:** HRM was performed in 13 adult patients (mean age = 61 years) referred as cases of DOS, out of which three had HRM features of DOS. All patients were subjected to HRM following which the results were analyzed. **Results:** Ten cases had essentially normal HRM findings. The other three patients had a high basal LOS pressure (BLOSP) and elevated distal wave amplitudes. However, all three cases had a normal LOS relaxation pattern. Manometric features of DOS may not be obvious in all referred cases of DOS, and hence, false-negative results are likely. DOS often has high BLOSP along with very high distal wave amplitudes. However, the LOS relaxation during swallows does not get affected. Although the mean age for DOS is 71 years, yet it can also occur in younger adults. **Conclusion:** Most of the DOS patients may not manifest manometrically at the time when they are actually undergoing the recording, which leaves a number of cases with a normal HRM finding. Thus, it would not be reasonable to rule out DOS in the absence of HRM confirmation.

**KEY WORDS:** Lower Oesophageal Sphincter; Distal Wave Amplitude; High-Resolution Manometry; Diffuse Esophageal Spasm; Motility Disorder

#### INTRODUCTION

The etiology of diffuse esophageal spasm (DOS), also called distal esophageal spasm, unknown. Patients typically present with dysphagia and chest pain. Radiographs reveal

tertiary contractions of the esophagus and manometry shows uncoordinated, spastic contractions of the smooth muscular part of the esophagus. Richter and Castell had put forward one of the initial specifications of the diagnostic criteria for DOS.<sup>[1]</sup> Further manometric studies have shown that DOS is a rare disease, wherein more than 10% (but <100%) of swallows are followed by simultaneous esophageal contractions. Neither high-amplitude contractions nor the duration of contraction was considered as a criterion previously.<sup>[2]</sup> It would be pertinent to mention here that simultaneous esophageal contractions may also be seen in diabetes mellitus, alcoholism, amyloidosis, scleroderma, and gastroesophageal reflux disease as well.<sup>[3]</sup> Therefore, it is always prudent to consider

Access this article online	
Website: <a href="http://www.njppp.com">www.njppp.com</a>	Quick Response code
DOI: 10.5455/njppp.2020.10.01020202026022020	

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the presence of simultaneous esophageal contractions with due patience and deliberation. Furthermore, in some cases, it may be difficult to monometrically differentiate DOS from the atypical disorders of lower esophageal sphincter (LOS) relaxation, and, on the other hand, inadequate relaxation of the LOS has been described in DOS too. Furthermore, simultaneous contractions may also point toward primary achalasia. Keeping the aforementioned evidence in mind, the only feature to distinguish DOS from the other esophageal motor conditions is that in DOS, some degree of normal peristalsis is usually preserved.<sup>[2]</sup>

High-resolution manometry (HRM) is the gold standard for the diagnosis of dysphagia when obstruction (e.g., a stricture) cannot be found by radiological or endoscopic interventions.<sup>[4,5]</sup> Apart from classifying achalasia into its subtypes and quantifying the LOS pressures, it is also indicated in patients presenting with chest pain, where cardiological causes have been ruled out, and DOS is being suspected. The present study was conceived with the purpose to describe the HRM features of DOS in patients who belonged to the Indian population.

## MATERIALS AND METHODS

The present study was conducted in the gastrointestinal motility laboratory of the department of physiology of a tertiary care center after obtaining the necessary institute ethical committee approval. It was an observational cross-sectional study, which analyzed the HRM features of all DOS patients who are referred for HRM over a period of 3 years. All patients who had presented with chest pain, but who had thereafter been found to have no cardiological abnormality were included in the study. A total of 13 patients ( $n = 13$ ; 8 males) were referred for HRM with a suspected diagnosis of DOS by the gastroenterology center of the affiliated hospital, following complete cardiology evaluation which ruled out the possibility of any cardiac cause of chest pain. The mean age of the patients was 61 years. However, out of 13, a total of only three patients could be diagnosed with DOS by HRM, and all three have been analyzed in this study. The patients were aged 39, 65, and 72 years, respectively, and were referred for HRM. Patients with dysphagia who were clinically diagnosed as achalasia or other motility disorders were excluded from the study. Patients who additionally had features suggestive of gastroesophageal reflux disease were also excluded from the study.

Esophageal manometry was performed using the high-resolution 16-channel water perfusion gastrointestinal manometric assembly with electronic pressure transducers (The Royal Melbourne Hospital, Victoria, Australia), along with its diagnostic software (Trace! 2005), which was used for the analysis of data. Written informed consent was obtained from all patients and they were asked to report to the laboratory in the morning after an overnight fast. Patients who were on drugs that may affect motility were told to withhold their medication for 48 h before the test. The HRM catheter was introduced into the esophagus through the nose, with the patients sitting upright on the bed. Once the LOS was localized, the patients were instructed to lie down in the right lateral recumbent position. Thereafter, the basal LOS pressure (BLOSP) was recorded for 3 min by asking the patients not to swallow. After obtaining the BLOSP, the patients were given a total of 10 swallows, with each swallow containing 5 ml of drinking water. The time gap between successive swallows was 30 s. Esophageal peristalsis patterns, and the minimum and maximum LOS pressures to swallows, were recorded. A similar set of 10 swallows (5 ml each, 30 s apart) was repeated after asking the patients to change their position from lying down to sitting upright. The software was accordingly corrected to eliminate the effects of the hydrostatic column associated with the upright posture.

DOS was diagnosed on HRM by the manometric criteria proposed by Richter *et al.*,<sup>[6]</sup> which are as follows:

- The presence of 20% or more simultaneous contractions with amplitudes of more than 30 mmHg (to distinguish from scleroderma)
- The presence of some normal esophageal peristalsis (to distinguish from achalasia).

## RESULTS

Data obtained were then analyzed for various manometric features. The results of the analysis are summarized in Table 1. A plot obtained for a patient during a swallow is depicted in Figure 1.

## DISCUSSION

Out of 13 cases, only 3 (23%) showed HRM features of DOS at the time of the recordings. The mean age of the patients

**Table 1: Summary of HRM findings in manometrically confirmed DOS cases**

Age (years)	Sex (M/F)	Mean BLOSP (mmHg)	Max. distal wave pressure (mmHg)	LOS nadir pressure (mmHg)	Simultaneous contractions (%)
39	M	28.7	330	7	80
65	F	24.2	267	2.9	70
72	M	49.2	320	4.6	80

DOS: Diffuse esophageal spasm, LOS: Lower esophageal sphincter, BLOSP: Basal lower esophageal sphincter pressure



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**How to cite this article:** Dey D, Singh K, Dua S. High-resolution manometry in the diagnosis of diffuse esophageal spasm: A rare motility disorder. *Natl J Physiol Pharm Pharmacol* 2020;10(04):334-337.

**Source of Support:** Nil, **Conflicts of Interest:** None declared.