

The Value of Carlsson-Dent Questionnaire in Diagnosis of Gastroesophageal Reflux Disease in Area With Low Prevalence of Gastroesophageal Reflux Disease

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Background/Aims

Symptom-based diagnosis for gastroesophageal reflux disease (GERD) has been accepted in the population with high prevalence. Carlsson-Dent questionnaire (CDQ) is a standardized symptom-based diagnosis tool for GERD. The value of this tool in the population with low prevalence is unknown. The aim of this study was to determine CDQ performance for diagnosis of GERD in Thai population with low prevalence versus endoscopy or 24 hour pH monitoring.

Methods

Patients with dyspepsia by Rome II criteria were recruited. All patients completed a Thai version of CDQ and underwent endoscopic examination. Those without esophagitis or peptic ulcer and positive CDQ score took pH monitoring.

Results

One hundred patients (68 female) with mean age \pm SD of 45.6 ± 12.4 years were recruited. Six with Los Angeles grade A esophagitis had negative CDQ score. In 44 with positive CDQ score, 3 had Los Angeles grade B esophagitis and 41 had pH monitoring done with 8 having positive test. The GERD diagnosis by CDQ was confirmed in 11 of 44 patients (25%). CDQ detected 11 out of 17 GERD detected by endoscopy and pH monitoring and the sensitivity of CDQ was 64%.

Conclusions

CDQ diagnosed more GERD in Thai population with low prevalence compared with endoscopy and pH monitoring. This may be due to some patients with functional heartburn were picked up by CDQ and some patients with GERD were not detected by endoscopy and pH monitoring.

(*J Neurogastroenterol Motil* 2011;17:164-168)

Key Words

Diagnosis; Gastroesophageal Reflux; Questionnaires

Received: January 5, 2011 Revised: February 6, 2011 Accepted: February 28, 2011

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Financial support: None.

Conflicts of interest: None.

Introduction

Gastroesophageal reflux disease (GERD) is a common problem in general practice. The reported prevalence of GERD using different definitions varied from 10%-30% in the Western population.¹⁻³ The prevalence of GERD in Eastern Asia ranged from 2.5%-6.7% and 1 cross-sectional study from Singapore showed the prevalence of 10.5%.⁴⁻⁶ No published data regarding the prevalence of GERD in Thailand are available. The study of Thai motility club using questionnaire reported 7.4% prevalence of GERD in community (unpublished data). The prevalence of esophagitis as detected by endoscopy from data collected by the stomach research group of Thailand during the process of developing dyspepsia guideline 10 years ago ranged from 4%-6% (unpublished data). We recently analyzed our prospectively stored computerized endoscopic database in 1,320 patients with dyspepsia between the year 2007-2008 and the prevalence of esophagitis was 4% (unpublished data). Based on these data, the prevalence of GERD in Thailand seems to be the same as other East Asian countries.

Heartburn and/or acid regurgitation are regarded as typical symptoms for GERD. Symptoms based-diagnosis is widely utilized in the western countries with acceptable sensitivity and specificity.⁷ Some structural questionnaires were developed to standardize the symptom-based diagnosis of GERD.⁸⁻¹⁵ The studies evaluating the validity of these types of questionnaire have conflicting results with reported sensitivity of 60%-92%.⁹⁻¹⁸ Carlsson and colleagues developed a self-administered questionnaire that focused on the nature of the sensations experienced by the patient as well as provoking, exacerbating and relieving factors. The questionnaire had a sensitivity of 92% and specificity of 19% in diagnosis of GERD compared with endoscopic esophagitis and 24 hour pH monitoring as standard.¹³ The prevalence of GERD in the target population could influence the performance of symptom-based diagnosis of GERD.^{5,7} The clinical value of this tool in the population with low prevalence of GERD is unknown. Thus, the aim of this study is to assess the usefulness of the Carlsson-Dent questionnaire (CDQ) in diagnosis of GERD in the population with low prevalence of GERD.

Materials and Methods

Patients

One hundred patients with dyspeptic symptoms by Rome II criteria with or without gastroesophageal reflux symptoms and age more than 18 years scheduled for endoscopy were prospectively enrolled from May 2007 to January 2008. Patients were excluded if they had alarm symptoms, a history of documented ulcer disease, gastric surgery, gastric cancer, or severe concomitant medical conditions. An informed consent for each patient was obtained before the entry to the study.

Study Site

This study was conducted at the NKC Institute of Gastroenterology and Hepatology, Faculty of Medicine, Prince of Songkla University which is a tertiary referring center for gastroenterology in the South of Thailand.

Study Protocol

All patients completed the Thai version of CDQ that had been validated by back translation. CDQ score of equal to or greater than 4 is a positive score for GERD. The baseline characteristics (age, gender, body weight, height, smoking history and drinking history), predominant symptoms and duration of symptoms before endoscopy were obtained.

Endoscopic examination was done in standard manner after patient had completed CDQ form. The endoscopists were not aware of patients' CDQ score. The endoscopic diagnosis of esophagitis and grading were based on Los Angeles (LA) classification.¹⁹ Barrett's esophagus was defined as the presence of specialized columnar epithelium equal or more than three centimeters above the gastric fold with confirmed histological study.²⁰ The significant findings were defined as gastric ulcer, gastric cancer, duodenal ulcer, severe erosive gastritis and severe erosive duodenitis.

Patients with erosive esophagitis, peptic ulcer, severe erosive gastritis, severe erosive duodenitis or score of CDQ less than 4 did not proceed to have 24 hour pH monitoring done. Those with negative or insignificant findings from endoscopy and score of CDQ equal or greater than four were scheduled for 24 hour pH monitoring study (Figure).

The ambulatory 24 hour esophageal pH monitoring was done with a pH probe placed 6 centimeters above the proximal

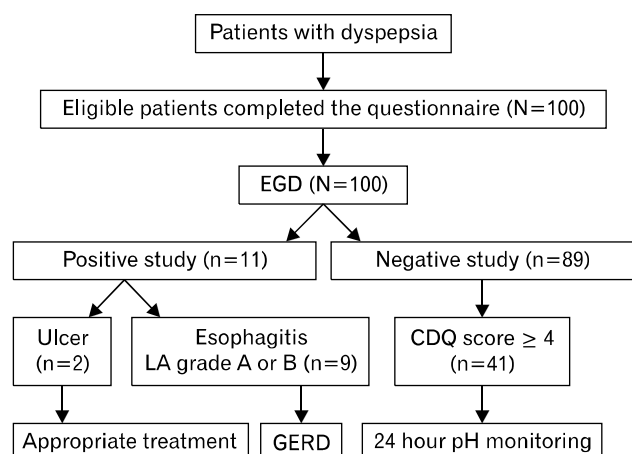


Figure. The flow diagram of the study. EGD, Esophago-gastroduodenal endoscopy; LA, Los Angeles; CDQ, Carlsson-Dent questionnaire; GERD, gastroesophageal reflux disease.

margin of Z-line as measured during endoscopy while withdrawing the gastroscope using Digitrapper[®] pH400 (Medtronic, Skovlunde, Denmark). Proton Pump inhibitor (PPI) was stopped for at least 1 week before the study. Subjects were provided a diary to record meal times, position changes and the time and type of symptoms encountered during the recording period. They were specifically instructed to avoid acidic fluid such as citrus fruit juice or any condiment containing vinegar, to pursue their daily activities and to have their usual diet. Data of 24 hour pH study were analyzed by a computer software (Medtronic). A positive 24 hour pH monitoring study was defined by the percentage of total time of pH below 4 being more than 5%.²¹ Patients with a positive test were diagnosed as having GERD.

Sample Size

Since there is no data regarding the performance of CDQ in low GERD prevalence population, 100 patients were arbitrarily selected to explore our concept.

The study protocol has been approved by the ethic committee of the faculty of medicine, Prince of Songkla University.

Statistical Methods

Data were analyzed by descriptive statistics and were expressed as mean with standard deviation and as frequency with percentage where appropriate.

Table 1. The Predominant Symptoms, Duration of Symptoms and Endoscopic Findings in 100 Patients

	Number of patients
Predominant symptom	
Heartburn	37
Regurgitation	4
Upper abdominal pain	25
Nausea/vomiting	9
Other symptoms ^a	25
Total	100
Duration of symptoms prior to endoscopy	
< 1 mo	8
> 1 mo to 1 yr	50
> 1 yr	42
Total	100
Endoscopic finding	
Reflux esophagitis	
Grade A	6
Grade B	3
Grade C	0
Grade D	0
Duodenal ulcer	1
Gastric ulcer	1
Non-erosive gastritis	12
Non-erosive duodenitis	4
Hiatal hernia	4
Gastric polyp	1
Normal findings	68
Total	100

^aFullness, early satiety and discomfort.

Results

There were 100 patients recruited from May 2007 to January 2008 including 68 female and 32 male and the mean age \pm SD was 45.6 ± 12.4 years with a range of 25-78 years. The predominant symptoms were heartburn in 37 (37%), upper abdominal pain in 25 (25%), other symptoms (fullness, early satiety and discomfort) in 25 (25%) nausea/vomiting in 9 (9%) and acid regurgitation in 4 (4%). The duration of symptoms was longer than 1 month in 92% and 42% had symptoms for more than 1 year. The endoscopic examinations were normal in 68 (68%). Eleven patients had significant lesions, 9 with erosive esophagitis (6 of LA grade A and 3 of LA grade B), 1 with gastric ulcer and 1 with duodenal ulcer. Twenty-one patients had insignificant lesions including 12 with gastritis, 4 with duodenitis, 4 with hiatal hernia and 1 with gastric polyp. None of the patients had Barrett's

Table 2. Carlsson-Dent Questionnaire Score, Endoscopic Esophagitis, H Study and Gastroesophageal Reflux Disease Diagnosis

	CDQ score	
	Positive	Negative
LA grade A or B esophagitis	3	6
All others ^a	41	50
Total	44	56

	pH study	
	Positive	Negative
41 with positive CDQ score and negative endoscopic esophagitis	8	33

	By CDQ	Number of cases in this group that were confirmed by endoscopy/pH study
GERD diagnosed	44	11

	CDQ score	
	Positive	Negative
All GERD by endoscopy + pH study	11	6

^aNormal endoscopy, duodenal ulcer, gastric ulcer and insignificant lesions.

CDQ, Carlsson-Dent Questionnaire; LA, Los Angeles.

Data are expressed as number.

esophagus or cancer (Table 1).

Forty-four cases were diagnosed with GERD by positive CDQ score. All 3 patients with LA grade B esophagitis showed positive CDQ score whereas all 6 patients with LA grade A esophagitis showed negative CDQ score. The remaining 41 patients (41%) with negative or insignificant endoscopic examination had 24 hour pH monitoring performed and 8 patients in this group presented with positive 24 hour pH monitoring tests. Overall, the diagnosis of GERD by CDQ was confirmed in 11 of 44 (25%) using endoscopy and pH monitoring as standard and CDQ missed 6 patients with LA grade A esophagitis (Table 2). CDQ was able to identify 11 of 17 cases with GERD also detected by endoscopy and 24 hour pH monitoring with the sensitivity of 64%.

Discussion

GERD is a common problem encountered in clinical practice. Many modalities of diagnostic tools are available for GERD diagnosis, ie, symptom-based, endoscopy, PPI test and 24 hour

pH monitoring. Symptom-based diagnosis is a readily available tool to all physicians. It creates neither discomfort nor complications compared to other modalities. Most of the guidelines for dyspepsia management accepted symptom-based diagnosis to exclude GERD from dyspepsia and this approach is widely practiced in the Western society with high prevalence of GERD²²⁻²⁵ with acceptable sensitivity and specificity.⁷ Structural questionnaire is one symptom-based diagnostic tool for GERD that had been developed to standardize this method. Various types of structural questionnaire had been reported in the literature⁸⁻¹⁵ and studies pertaining to the performance of these questionnaires yielded conflicting results.⁹⁻¹⁸ Currently, no structural questionnaire reported in the literature has yet met the criteria of perfect tool as proposed by Stanghellini and colleagues.⁸ The CDQ was reported by Carlsson et al¹³ to have a sensitivity of 92% and specificity of 19%. Numans et al¹⁶ evaluated the CDQ in primary care setting and found that the performance of CDQ was not better than chance diagnosis by flipping a coin. Hung et al¹⁷ reported a poor performance of CDQ in predicting esophagitis and only 16% of patients with positive CDQ score had esophagitis detected by endoscopy. Factors that may influence the accuracy of symptom-based tools in GERD diagnosis include the prevalence of GERD in population studied, culture, ethnics, care setting and perception of the patients. The sensitivity of a tool will increase in proportion to the prevalence of disease in the population.^{5,7} The sensitivity of CDQ in our study was 64% and this may be an overestimation due to the omission of pH monitoring in patients with insignificant endoscopic findings with CDQ score less than four will miss some patients with GERD. Only 25% of patients with GERD diagnosed by CDQ was confirmed by endoscopy or 24 hour pH monitoring in our study. Our data together with data of Hung et al¹⁷ showed a poor performance of CDQ in the area with low prevalence of GERD. The diagnosis of GERD by CDQ alone may lead to inappropriate management of patients if the physicians are pressing on with the GERD treatment. Some new versions of questionnaire such as frequency scale for the symptoms of GERD, S scale and others has been studied in Asian countries with promising results.^{10-12,14,15} Further studies to validate these questionnaire in different population are needed to confirm the validity of these tools.

The limitations of our study include the followings: (1) the studied population was from a tertiary centre so it may not represent the population in the primary care setting where symptom-based diagnosis is the primary tool; (2) the selection bias may increase the number of patients with functional heartburn

and this may account for, to some extent, the increased number of patients with positive CDQ score without pathological GERD; (3) the number of the patients was rather small; (4) the omission of pH monitoring in patient with insignificant endoscopic findings with CDQ score less than 4 might have missed some patients with GERD and the full assessment of CDQ performance in terms of sensitivity, specificity, positive predictive value and negative predictive value could not be performed; and (5) the using of 24 pH monitoring with abnormal acid exposure time alone as a gold standard for the diagnosis of non-erosive GERD may have misclassified patients with GERD who had normal acid exposure and positive symptom sensitivity index, and patients with weak acid reflux or non-acid reflux.

In conclusion, CDQ in our study of low GERD prevalence population diagnosed more GERD than endoscopy or pH monitoring. This may be because some patients with functional heartburn had been picked up by CDQ and some patients with GERD were not detected by endoscopy or pH monitoring. Due to limited availability of other diagnostic tools in this region, it is acceptable to use symptom-based diagnosis with a reserve that it may misclassify functional heartburn as GERD and the caring physicians should be willing to refer if poor or no response to PPI treatment occur rather than pressing on adding medication aiming to treat GERD.

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