Esophageal and gastric dysmotility in non ulcer dyspepsia

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Background: The pathophysiology of non ulcer dyspepsia is poorly understood. Data on gastrointestinal motility alterations in this condition in the Indian population are scanty. We studied esophageal and gastric motility in patients with non ulcer dyspepsia.

Methods: 58 consecutive patients with non ulcer dyspepsia (according to the Rome criteria) were studied; 10 healthy volunteers were studied as controls. Esophageal transit of solid and liquid boluses (in all patients) and solid-phase gastric emptying (in 20 patients) were studied using scintigraphic techniques.

Results: Delayed esophageal transit and delayed gastric emptying were observed in 32 (55%) and 9 (45%) patients, respectively. Delay of both esophageal and gastric transit was found in 5 patients. Mean (SD) esophageal transit for liquid bolus was significantly delayed in patients (9.3 [3.7] s) compared to controls (7.0 [2.0] s; p<0.01). Mean (SD) gastric emptying time (T_{g}) was significantly delayed in patients (61.6 [13.6] min) compared to controls (50.0 [5.0] min; p<0.001). Esophageal and gastric delayed transit was found in about two thirds of patients with dysmotility-like dyspepsia, but there were no significant difference in these abnormalities among different subgroups of dyspepsia.

Conclusion: High prevalence of esophageal and gastric transit delay was found in non ulcer dyspepsia, particularly in the dysmotility subgroup. [Indian J Gastroenterol 2000;19:109-111]

Key words: Esophageal transit time, gastric emptying time, scintigraphy

Non ulcer dyspepsia (NUD) is defined as upper abdominal or retrosternal pain, discomfort, heartburn, nausea, vomiting or other symptoms referable to the proximal alimentary tract and lasting for more than 4 weeks, unrelated to exercise and for which no focal lesion or systemic disease can be found responsible. The pathophysiology of NUD is poorly understood, though various mechanisms like disturbances in visceral perception, gastric acid secretion, gastroduodenal motility and Helicobacter pylori infection have been implicated. Motility studies have shown that approximately one half of patients with dyspeptic symptoms of unknown origin have delayed gastric emptying and antral hypomotility.

Data on motility abnormalities in NUD in Indian subjects are scanty. The present study was undertaken to evaluate esophageal and gastric motor dysfunctions in patients with NUD.

Methods

Patients attending the out-patients department of our hospital, with symptoms of dyspepsia, were invited to participate in the study. The patients were diagnosed based on the Rome criteria. Ten healthy volunteers were also studied as controls. All subjects gave written informed consent for the study. The protocol was approved by the institute’s ethics committee. Detailed history was taken regarding the symptoms of dyspepsia like abdominal pain, bloating, early satiety, nausea, heartburn, belching, regurgitation and loss of appetite. Clinical examination was done to exclude organic illness.

Patients were excluded from the study if they met any of the following criteria:

- b. Endoscopic evidence of esophagitis, gastric or duodenal ulceration or any other organic lesion.
- d. Evidence of hepatobiliary or pancreatic disease on abdominal ultrasonography.
- e. History of systemic illness like diabetes mellitus, hypertension, chronic obstructive pulmonary disease.
- f. Evidence of parasitic infestation of the gut by stool examination in any of three consecutive days.

Motility study

Esophageal and gastric motility were studied scintigraphically, using 99m technetium sulfur colloid as the radiotracer and Picker Dyna 4C (USA) gamma camera with an on-line computer PCS-512 for data analysis. Esophageal scintigraphy was done in a fasting state, initially with liquid bolus followed by solid bolus, the patients having stopped all drugs for at least 3 days. The patient was first given test swallows with unlabeled bolus. The labeled liquid bolus, prepared by mixing 500 mCi 99m technetium sulfur colloid with 15 mL of fruit juice, was then ingested in a single swallow and a fur-
ther dry swallow was advised after 30 seconds; images were acquired during this period at the rate of 5 frames per second for 50 seconds. This was followed by 100 mL plain water drink to wash off any residual radioactivity in the esophagus. The patient then ingested a solid bolus, prepared from egg cooked to hardiness after thorough battering and labeling with the isotope (500 mcil/30 g); this was followed by repeated dry swallows at 15-second intervals. The images for solid bolus transit were taken as 1 frame per 3 seconds for 3 minutes. Esophageal transit time was calculated from the time of initial entry of the radiolabeled bolus into the esophagus till the time 90% of radioactivity was cleared from the esophagus.

Solid-phase gastric emptying was done according to the methods described by Waldron et al. and Maddern et al. The meal consisted of two beaten raw eggs steamed for 15 minutes after thorough battering and labeling with 10 mcil of 99 m technetium sulfur colloid. After eating the solid meal mixed with 100 mL unlabeled fruit juice, images were collected at five-minute intervals for 120 minutes. The resulting series of images were used to evaluate the lag period before the onset of emptying and the time for fifty percent emptying (T50).

The results for esophageal transit time and gastric emptying time were defined as delayed if the value was more than two standard deviation (SD) of the mean of control values.

Statistical analysis

The results are expressed as mean (SD). Student's t test was used to compare the transit times of patients and controls. The prevalence of dysmotility in different categories of dyspepsia was compared using the c2 test.

Results

Fifty-eight patients with non ulcer dyspepsia (mean age 31.2 [9.0] years; 31 men) were studied. The mean duration of symptoms was 40.7 (36.1) months. Ten healthy volunteers (age 33.5 [6.4] years; 6 men) were studied as controls.

The prevalence of various symptoms of dyspepsia is shown in Table 1. Most patients (54) had more than one symptom. According to the predominant presenting symptoms, patients were categorized into dysmotility-like (30 cases; 51.7%), reflux-like (13; 22.2%), ulcer-like (9; 15.5%) and nonspecific (6; 10.3%) dyspepsia.

Esophageal transit was delayed in 32 cases (55.1%)—for solid bolus alone in 4 cases, liquid bolus alone in 15 and for both solid and liquid bolus in 13 cases. Esophageal transit time for liquids was significantly delayed in patients (9.3 [3.7] s) compared to control subjects (7.0 [2.0] s; p<0.01). No significant difference was observed in esophageal transit time for solids in patients (19.9 [13.9] s) and in controls (12.6 [2.1] s).

Of the 20 patients in whom gastric emptying was studied, it was abnormal in 9 (45%); of these, 5 also had abnormal esophageal transit. Six of 11 patients with normal gastric emptying had abnormal esophageal emptying. Solid-phase gastric emptying time (T50) was significantly delayed in patients (61.7 [13.6] min) compared to controls (50.0 [5.0] min; p<0.001).

On subgroup analysis, delayed transit was found in nearly two-thirds of patients with dysmotility-like dyspepsia but there was no significant difference in these abnormalities among different subgroups of dyspepsia (Table 2).

Discussion

The prevalence of different symptoms and categories of NUD in our patients is similar to that observed by Waldron et al. A number of nonmotility and motility disorders have been identified as potential causes of NUD. Delayed esophageal transit of solid bolus or liquid bolus or both was found in 55 percent of our patients with NUD. Hands et al. found esophageal motility disorders like nutcracker esophagus and diffuse esophageal spasm in 20 percent of their patients with functional dyspepsia.

Gastric motor dysfunction demonstrated by scintigraphic studies of gastric emptying, electrogastrography, or antroduodenal manometry has been reported in 25 to 60 percent of patients with NUD. Delayed gastric emptying was found in 45 percent of our patients. Mittal et al. found similar frequency of delayed gastric emptying of solids in dysmotility type of NUD. Delayed gastric emptying could not be correlated with different subgroups of dyspepsia in our study, but the number of patients we studied was small. No difference in gastric emptying between different subgroups of dyspepsia was found by others. Improvement in gastric emptying

| Table 1: Prevalence of various symptoms in patients with non ulcer dyspepsia (n=58) |
|----------------------------------------|----------------|
| Symptoms                              | No. of cases (%) |
| Abdominal pain                        | 56 (96.5)       |
| Abdominal bloating                    | 30 (51.7)       |
| Belching                              | 22 (37.9)       |
| Nausea                                | 24 (41.3)       |
| Heartburn                             | 18 (31.0)       |
| Regurgitation                         | 8 (13.7)        |
| Loss of appetite                      | 14 (24.1)       |
| Early satiation                       | 10 (17.2)       |

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<th>Table 2: Prevalence of motility abnormalities in different types of dyspepsia</th>
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<td>Dyspepsia category</td>
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</tr>
<tr>
<td>Dysmotility-like</td>
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<td>Ulcer-like</td>
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<td>Nonspecific</td>
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and in dyspepsia may not correlate. Abnormalities in regional gastric emptying may be correlated with symptoms. Decreased compliance in the proximal stomach, with rapid proximal gastric transit and subsequent antral distension has been reported in some patients with dyspepsia.15,16

To conclude, we found high prevalence of delayed esophageal dysfunction in patients with non ulcer dyspepsia.

References

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