

# Lifestyle Intervention in Gastroesophageal Reflux Disease

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Q5 **BACKGROUND & AIMS:** Gastroesophageal reflux disease (GERD) affects up to 30% of adults in Western populations and is increasing in prevalence. GERD is associated with lifestyle factors, particularly obesity and tobacco smoking, which also threatens the patient's general health. GERD carries the risk of several adverse outcomes and there is widespread use of potent acid-inhibitors, which are associated with long-term adverse effects. The aim of this systematic review was to assess the role of lifestyle intervention in the treatment of GERD.

**METHODS:** Literature searches were performed in PubMed (from 1946), EMBASE (from 1980), and the Cochrane Library (no start date) to October 1, 2014. Meta-analyses, systematic reviews, randomized clinical trials (RCTs), and prospective observational studies were included.

**RESULTS:** Weight loss was followed by decreased time with esophageal acid exposure in 2 RCTs (from 5.6% to 3.7% and from 8.0% to 5.5%), and reduced reflux symptoms in prospective observational studies. Tobacco smoking cessation reduced reflux symptoms in normal-weight individuals in a large prospective cohort study (odds ratio, 5.67). In RCTs, late evening meals increased time with supine acid exposure compared with early meals (5.2% point change), and head-of-the-bed elevation decreased time with supine acid exposure compared with a flat position (from 21% to 15%).

**CONCLUSIONS:** Weight loss and tobacco smoking cessation should be recommended to GERD patients who are obese and smoke, respectively. Avoiding late evening meals and head-of-the-bed elevation is effective in nocturnal GERD.

*Keywords:* GERD; Heartburn; Acid Regurgitation; Therapy; Treatment.

Q7 Q8 **G**astroesophageal reflux disease (GERD), defined by at least weekly symptoms of heartburn or acid regurgitation, is increasingly common.<sup>1</sup> The prevalence in adults ranges from 30% in some Western populations to less than 10% in East Asian populations, and the incidence is approximately 5 per 1000 person-years in Western populations.<sup>1</sup> GERD is associated with reduced health-related quality of life,<sup>2</sup> decreased work productivity<sup>3</sup> and increased risk of esophageal adenocarcinoma.<sup>4</sup> The annual incidence of esophageal adenocarcinoma is increasing worldwide, from 3.5% in Scotland to 8.1% in Hawaii, which parallels the increasing prevalence of GERD.<sup>5</sup> In addition, GERD diagnostic tests and treatments carry high societal costs.<sup>6</sup>

The pathophysiology of GERD is dominated by functional and anatomic defects at the gastroesophageal junction, including reduced pressure and increased reflux episodes associated with transient relaxations of the lower esophageal sphincter and formation of hiatal hernia, which promotes and facilitates reflux.<sup>7-9</sup> Esophageal motility and salivary bicarbonate contribute to

esophageal acid clearance and buffering, respectively, and reduce acid contact time in the esophagus.<sup>10,11</sup> Visceral obesity increases the pressure over the gastroesophageal junction, thus facilitating reflux,<sup>12</sup> and tobacco smoking reduces the lower esophageal sphincter pressure and salivary bicarbonate secretion, which facilitates reflux and decreases acid buffering, respectively.<sup>13,14</sup>

The main established risk factors of GERD are heredity, obesity, and tobacco smoking.<sup>15-18</sup> High dietary fiber intake and moderate physical exercise seem to reduce this risk,<sup>18</sup> whereas sex and age do not strongly influence the risk of GERD.<sup>19,20</sup> Obesity is of particular interest because it is increasing in prevalence in parallel

*Abbreviations used in this paper:* BMI, body mass index; CI, confidence interval; GERD, gastroesophageal reflux disease; OR, odds ratio; PPI, proton pump inhibitor; RCT, randomized clinical trial.

**Table 1.** Lifestyle Intervention in GERD

Category	Study	Design	Intervention	Findings	Level of evidence <sup>a</sup>	Comparison with current guidelines		
						CAG (2005) <sup>24</sup>	AGA (2008) <sup>34,35</sup>	ACG (2013) <sup>36</sup>
<b>Weight loss</b>	Mathus-Vliegen and Tytgat, <sup>37</sup> 1996	RCT	Gastric balloon vs sham treatment	Normalization of pH measurements in 3 of 5 with weight loss	A	Lifestyle modifications are ineffective for frequent or severe symptoms, but may be beneficial if obvious dietary precipitants, obesity or tobacco smoking	Weight loss in obese patients; head of the bed elevation if symptoms when recumbent; other lifestyle modifications tailored to the individual patient	Weight loss recommended for GERD patients with overweight or recent weight gain; head of bed elevation and avoidance of meals 2–3 hour before bedtime recommended if nocturnal GERD; routine global elimination of food that can trigger reflux not recommended
	Mathus-Vliegen and Tytgat, <sup>38</sup> 2002	RCT	Gastric balloon vs sham treatment	Reduced acid exposure in sham group (the effect of mere weight loss)				
	Mathus-Vliegen et al, <sup>39</sup> 2003	RCT	Gastric balloon vs sham treatment	Reduced acid exposure in sham group (the effect of mere weight loss)				
	Singh et al, <sup>40</sup> 2013	RCT	Structured weight loss program vs telephone-based group conference	Decreased symptom prevalence and score in both groups				
	Austin et al, <sup>41</sup> 2006	Nonrandomized prospective study	Very low-carbohydrate diet	Decreased acid exposure and symptom score				
	Fraser-Moodie et al, <sup>42</sup> 1999	Nonrandomized prospective study	Dietary advice	Decreased symptom score				
	Jacobson et al, <sup>43</sup> 2006	Prospective population-based cohort study	No intervention	Dose-dependent decrease in symptom prevalence				
	Ness-Jensen et al, <sup>44</sup> 2013	Prospective population-based cohort study	No intervention	Dose-dependent decrease in symptoms, improved medical treatment success				
	Kjellin et al, <sup>45</sup> 1996	RCT	Low-caloric diet vs control	No effect on symptoms, endoscopic findings, or acid exposure				
	Cremonini et al, <sup>46</sup> 2006	Prospective population-based cohort study	No intervention	No association with symptoms				

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