

Iceberg Lettuce Reduces the Severity of Gastroesophageal Reflux Symptoms: Two Case Reports

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Abstract

Case Report

Gastroesophageal reflux is a common disease and generally occurs when a portion of the contents of the stomach pass through the lower esophageal sphincter and into the esophagus and returns. If gastroesophageal reflux occurs regularly then symptoms of gastroesophageal reflux disease or GERD can develop. Typical gastroesophageal reflux symptoms (RS) are often defined as heartburn/discomfort or a feeling that stomach contents could reflux into the oesophagus. Gastroesophageal RS are commonly managed by making dietary and lifestyle changes but may also require the use of antacid tablets or proton pump inhibitors (PPIs). Two cases are presented where the effects of consuming iceberg lettuce (IL) on the severity of RS, classified as mild, medium or severe, are reported. It was found for both patients, IL consumed after a meal could resolve mild RS, resolve or reduce the severity of moderate RS, and reduce the severity of severe RS to mild or moderate symptoms, but not resolve them.

Keywords: Lettuce, reflux, gastroesophageal reflux, GERD, proton pump inhibitors, PPI.

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INTRODUCTION

Two cases are presented where patients with long-standing gastroesophageal reflux symptoms (RS) consumed iceberg lettuce (IL) after a meal (ILAM) when RS occurred or with the meal (ILWM) and scored the RS severity. The patients did not regularly consume vegetables in their diets and were not aware of the amounts recommended by dietary guidelines as 5 serves daily (1 serve = 1 cup = 75g) with 1 serve as raw leafy green vegetables [1].

A review of the bioactive compounds and the benefits to human health from lettuce, reported 6 human trials finding it has anticancer bioactivity (gastroesophageal, colorectal, lung, breast and liver cancers) [2]. The consumption of leafy vegetables ($\approx 2 - 10$ g/day), which includes lettuce (but not cruciferous vegetables), was not found to be associated with daily GERD symptoms, in a cohort study [3]. Data from a Swedish population-based case-control study found a dietary pattern rich in lignans, quercetin and resveratrol, which are components in lettuce, decrease the risk of developing oesophageal adenocarcinoma, oesophageal squamous-cell carcinoma and gastroesophageal junctional adenocarcinoma [4]. In a study with 12 participants, iceberg lettuce consumption was found associated with abdominal distention, despite being a

low gas-releasing substrate for microbiota fermentation [5]. Romaine lettuce (300g) was found to increase water content in the small bowel, from a magnetic resonance imaging with 15 participants [6]. The consumption of lettuce juice, or nitrate rich diets, has been associated with a decrease of gingival inflammation in 37 periodontal recall patients and with changes in the subgingival microbiome [7]. A clinical trial with 16 participants, using romaine lettuce (100g), found no significant change to plasma triglycerides and total cholesterol but a delayed postprandial glycemic response [8]. The nitrate concentration in differentially fertilised lettuce materials (50g) has been found to lowering systolic blood pressure in 19 participants over two separate days [9]. An observational study, with 50 patients, found that dietary changes which include plant-based diets are an alternative cost-effective therapeutic approach for patients with laryngopharyngeal reflux [10]. No reports were found regarding lettuce as a treatment for RS.

CASE REPORT

Case 1

A 63 year-old male, with no significant medical conditions, has a 10 year history of RS that typically occur 2-3 hours after a meal 2-3 times a week. The RS reported could be defined as

heartburn/discomfort or a feeling that stomach contents could reflux into the oesophagus [11]. Symptoms were managed by taking the antacid, calcium carbonate (CC 300mg) on demand, but did not always eliminate them. A trial of the proton pump inhibitor (PPI) esomeprazole (20 mg) was initiated for 8 weeks once daily and was reported to bring relief, but it was claimed responsible for the development of halitosis and discontinued [11]. A simple to use, patient specific scoring system was developed and scored relative RS severity on a scale from 0 - 3 as no or transient not requiring treatment RS = 0, mild RS = 1, moderate RS = 2 and severe RS = 3. Although more complex questionnaires have been developed, consisting of similar questions to quantify reflux symptoms, they may not necessarily be superior [12].

The patient chose to follow the recommended dietary guidelines and began consumption of IL (\approx 40 - 70g) most days with or after the evening meal [1]. The patient recorded 5 possible ways RS were treated and scored over 50 days:

- No reflux symptoms occurred for 5/50 days,
- IL with the evening meal (ILWM) for 9/50 days,
- IL after the evening meals (ILAM) but if RS persisted CC was also taken in addition over 14/50 days (Figure 1A),
- CC after the evening meal but if RS persisted IL (ILAM) was also taken in addition over 22/50 days (Figure 1B).

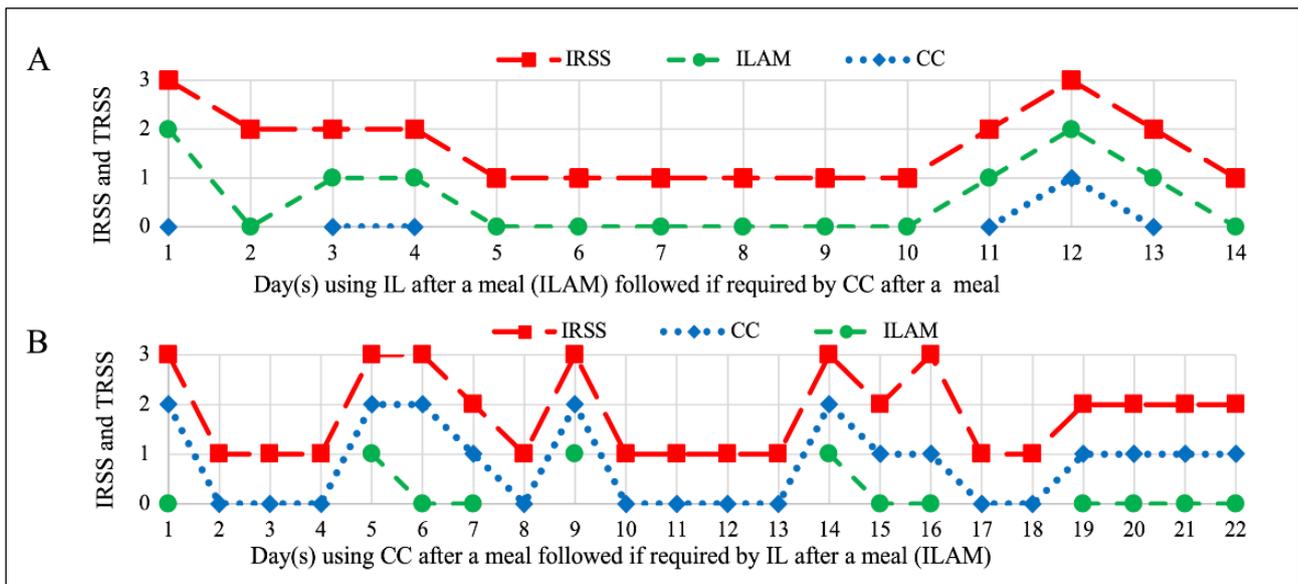
After the 50 days the patient recognised consuming ILWM could reduce the severity of RS and so included IL daily as part of the meal for an additional 30 days as:

- IL with the evening meal (ILWM) but if RS persisted CC was also taken in addition for 30/30 consecutive days (Figure 1C).

Case 2

A 61year-old female with no significant medical conditions, reported a 5-year history of infrequent reflux symptoms that typically occur 2-3 hours after a meal with RS defined as above. A trial of the proton pump inhibitor (PPI) esomeprazole (20 mg) was initiated for 8 weeks once daily and was reported to bring relief but was discontinued and later only taken on-demand [11]. Symptoms were managed by avoiding processed and fatty food. The patient wanted an improved diet and in accordance with the recommended dietary guidelines, began consuming IL (\approx 40-70g) but after a meal (ILAM) when RS occurred [1]. Any changes in RS were recorded using the same 0-3 scale above with RS occurring 20 times over 46 days (Figure 1D).

Figure 1 the change in the IRSS after consuming IL or CC or both IL and CC with dashed lines for non-consecutive (Fig. A, B, D) and a solid line for consecutive (Fig. C) treatment days. (A) Case 1; the change in the IRSS after taking IL after the meal (ILAM) and if RS persisted also taking CC with unresolved RS on day 12. (B) Case 1; the change in the IRSS after taking CC after the meal and if RS persisted also taking ILAM with unresolved RS on days 5, 9, and 14. (C) Case 1; the change in the IRSS/ILWM after consuming IL with every meal (ILWM) and if RS persisted also taking CC with RS fully resolved on each day of the 30 days. (D) Case 2; the change in IRSS after taking ILAM with unresolved RS on days 3, 5, 9, 14, 15 and 20.



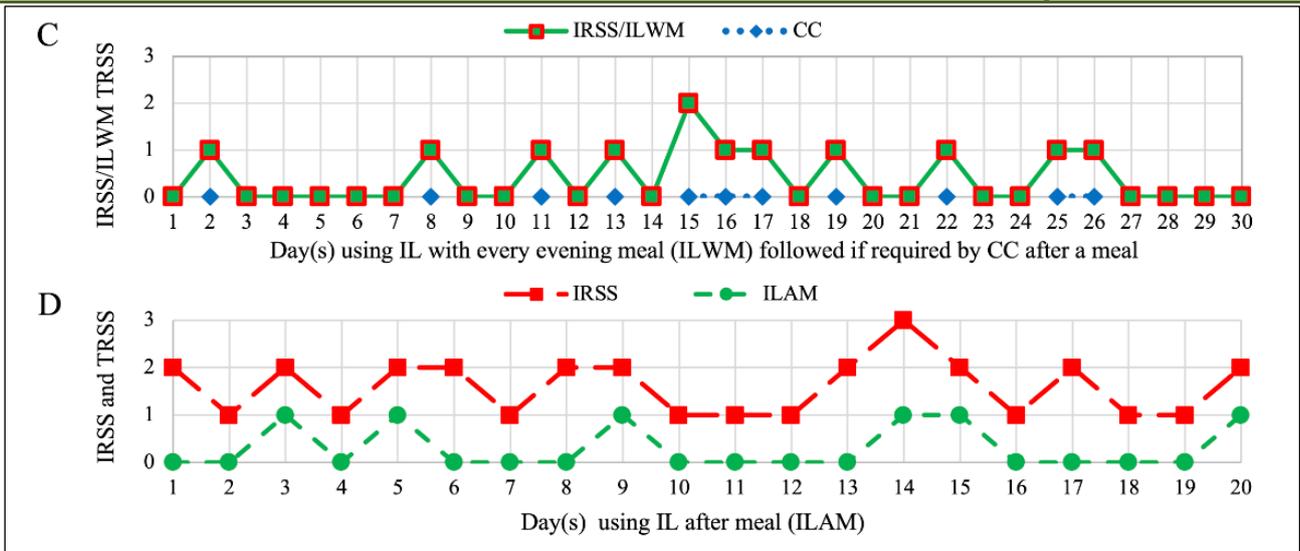


Figure 1. The change in the IRSS after consuming IL or CC or both IL and CC with dashed lines for nonconsecutive (Fig. A, B, D) and a solid line for consecutive (Fig. C) treatment days. (A) Case 1; the change in the IRSS after taking IL after the meal (ILAM) and if RS persisted also taking CC with unresolved RS on day 12. (B) Case 1; the change in the IRSS after taking CC after the meal and if RS persisted also taking ILAM with unresolved RS on days 5, 9, and 14. (C) Case 1; the change in the IRSS/ILWM after consuming IL with every meal (ILWM) and if RS persisted also taking CC with RS fully resolved for each day of the 30 days. (D) Case 2; the change in IRSS after taking ILAM with unresolved RS on days 3, 5, 9, 14, 15 and 20.

DISCUSSION

Case 1

The patient initially recorded IRSS and IRSS/ILWM scores for 50 days and for 5/50, no RS occurred. For 8/9 days of the 50 days, when IL was included with the evening meal, IRSS/ILWM = 0 although it was unknown if RS occurred on these days and was treated, or simply did not occur at all. For 17/36 of the remaining days, when the IRSS = 1, ILAM (7/36 days) or CC (10/36 days) gave a TRSS = 0, indicating IL was about as effective as CC at reducing RS (Figure 1A, 1B). The severity of IRSS and TRSS for each day may not necessarily be related to the following days RS, as IL or CC were not always taken on consecutive days (Figure 1A, 1B). Anecdotal evidence from both patients suggests that daily RS variations are related to many factors but mostly to dietary choices and the quantity of food consumed rather than the previous days RS. For 15/36 days, when the IRSS = 2 or 3 and both IL and CC were taken, the TRSS = 0, but was not sufficient for 4/36 days or 11% of days when IRSS = 3 and RS remained unresolved with a TRSS=1 (Figure 1A, day 12 and Figure 1B, days 5, 9 14).

The patient found RS did not occur when using ILWM (8/9 days of the 50 days with no RS) and so included an additional 30 days, where IL was consumed on consecutive days with every meal (Figure 1C). A decreasing trend in RS was not observed over the 30 consecutive days as RS still occur on days 22, 25 and

26. An IRSS/ILWM score was recorded every day and for 19/30 days, no RS occurred. There were no days where the IRSS/ILWM = 3 with 11/30 days IRSS/ILWM = 1 or 2, requiring CC ≈ 37% of the days to achieve a TRSS = 0. The patient claimed ILWM was better than ILAM to manage RS but was not always convenient and that ILAM or CC often began to relieve RS within 5-10 minutes.

Case 2

The IRSS were recorded for 20 days (non-consecutive) over 46 days with 26/46 days where RS did not require treatment (Figure 1D). For 9/20 days the IRSS = 1 and was resolved by consuming ILAM. For 10/20 days the IRSS = 2 with RS reduced by consuming ILAM to a TRSS = 0 for 5/20 days and to a TRSS = 1 for 5/20 days. Only day 14 had an IRSS = 3, reduced to a TRSS = 1 by consuming ILAM. With ILAM the RS severity was reduced on all 20 days but remained unresolved for 6/20 days or 30% of days, with no further treatment taken. The patient claimed the use of PPIs was not required over the 46 days and the effects of eating IL were pretty immediate.

Much has been reported about including leafy green vegetables in the diet and it is recommended by dietary guidelines, yet no reports were found that quantify any benefits for IL in relation to acute or chronic gastroesophageal reflux symptoms [1, 4]. It is recognised that these findings are limited, as only 2 cases have been considered, but may be of benefit by

contributing to the develop of future protocols for larger studies. Currently, to diagnose the classic GERD symptoms of heartburn and regurgitation for patients who have no alarming symptoms, the first line treatment is to undertake a trial of PPI for 8 weeks, but based on the findings from the 2 cases, a safer long-term alternative treatment of IL and antacid tablets may be worthy of further investigation [11].

CONCLUSION

It was found for both patients, IL consumed after a meal could resolve mild RS, resolve or reduce the severity of moderate RS, and reduce the severity of severe RS to mild or moderate symptoms, but not resolve them. For Case 1, when consuming IL with a meal, the RS did not reach the maximum score of 3, suggesting IL with a meal may be more beneficial than after a meal, in reducing the severity of RS.

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Ethical approval and consent to participate

The manuscript adheres to the national ethical guidelines for research on human subjects which is consistent with the principles outlined in the Declaration of Helsinki. Written informed consent was obtained from the two patients in the present study for the publication of their data and both have read the manuscript and approved it for publication.

Competing interests: The author declares that there are no competing interests.

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