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Impact of COVID-19 Lockdown on Stress and Diet Adherence in Patients with Laryngopharyngeal Reflux

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ABSTRACT

Objectives: *To study the impact of lockdown on diet adherence and stress in patients treated for laryngopharyngeal reflux (LPR).*

Methods: *Patients with a positive LPR diagnosis at the hypopharyngeal-esophageal impedance-pH monitoring were treated from the pre- to lockdown period with diet, behavioral changes and an association of proton pump inhibitors and alginate. The following outcomes were used to assess the clinical features of patients: reflux symptom score-12 (RSS-12) and reflux sign assessment (RSA). At post-treatment time, patients were invited to evaluate the impact of lockdown on diet adherence and stress management with a predefined grid of foods and beverages and perceived stress scale (PSS), respectively.*

Results: *Thirty-two patients completed the evaluations. RSS-12 and RSA significantly improved from baseline to three-month post-treatment. Most patients experienced mild-to-severe stress level at the end of the lockdown. The level of stress substantially increased in 34% of patients due to lockdown, while it did not change in 44%. In 34% of cases, patients reported that adherence to antireflux diet was better than*

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initially presumed thanks to the lockdown period, while 44% believed that the lockdown did not impact their adherence to diet. PSS and RSS-12 were significantly correlated at the end of the pandemic (p<0.001). The increase of stress level was positively associated with the lack of adherence to diet (p=0.039).

Conclusion: *During the lockdown, diet habits were improved or unchanged in most LPR cases, while stress level was increased in one-third of patients.*

Keywords: reflux, laryngopharyngeal, larynx, laryngology, otolaryngology, head neck, gastroesophageal, lockdown, COVID-19, SARS-CoV-2, diet, stress, quarantine.

INTRODUCTION

Laryngopharyngeal reflux (LPR) is an inflammatory condition of the upper aerodigestive tract tissues related to the direct and indirect effect of gastroduodenal content reflux, which induces morphological changes in the upper aerodigestive tract (1). The consumption of high-fat, high-quick-release sugar and low-protein foods and beverages, on one side, and stress (autonomic nerve dysfunction), on the other side, are both factors that may negatively impact the esophageal sphincter tonicity, leading to pharyngeal reflux events (1, 2). With the recent coronavirus disease 2019 (COVID-19) pandemic, numerous countries imposed lockdown to reduce the virus spread in the population. Many citizens were confined to home during several weeks, which had a positive (3) or negative (4) influence on individual lifestyle and eating habits, as reported in the recent literature.

In this study, we briefly presented the impact of lockdown on antireflux diet adherence and stress of patients treated for LPR disease. ❑

METHODS

Patients with a positive LPR diagnosis at the 24-hour hypopharyngeal-esophageal multichannel intraluminal impedance pH-monitoring (HEMII-pH) prior to the COVID-19 lockdown were followed throughout the lockdown period (March to December 2020) in the Department of Otolaryngology–Head & Neck Surgery of XX. The LPR diagnosis was based on the occurrence of LPR symptoms and the occurrence of more than one acid or non-acid pharyngeal reflux event during HEMII-pH (OFF medication) (5). To study the influence of lockdown on diet adherence and stress management, we included only patients who started treatment just before the lockdown. Participants to our research were followed throughout the lockdown periods. Patients with another source of stress during the lockdown (other than the pandemic) or those who did not adhere to the antireflux diet were excluded.

The local ethics committee approved the study protocol (XX, n°BE076201837630). Patients consented to participate.

Hypopharyngeal-esophageal multichannel intraluminal impedance-pH testing

The probe placement and configuration characteristics were detailed in a previous publication (6).

Briefly, the catheter was placed in the morning before breakfast (8:00 a.m.) and removed the next day in the morning. The catheter was composed of eight impedance segments and two pH electrodes (Versaflex Z®, Digitrapper pH-Z testing System, Medtronic, Europe). The six esophageal impedance segments were placed along the esophagus zones (Z1 to Z6) at 19, 17, 11, 9, 7 and 5 cm above the lower esophageal sphincter (LES). The pharyngeal impedance segments were placed 1 and 2 cm above the upper esophageal sphincter (UES) in the hypopharynx. The pH electrodes were placed 2 cm above LES and 1-to-2 cm below UES, respectively. The LPR diagnosis criteria was based on the occurrence of more than one acid (pH $\leq$ 4.0) or non-acid (pH > 4.0) hypopharyngeal reflux event (off proton pump inhibitors) (5).

Clinical and therapeutic outcomes

Symptoms were evaluated with reflux symptom score-12 (RSS-12) (7), which is a validated 12-item patient reported-outcome questionnaire including otolaryngological, digestive and

respiratory symptoms of reflux. Reflux sign assessment (RSA) was used to rate oral, pharyngeal and laryngeal findings associated with LPR throughout the treatment period (8). Patients' stress level was evaluated at the end of the lockdown with Perceived Stress Scale (PSS), a 10-item validated patient-reported outcome questionnaire (9). Normative data reported that a PSS <12 was normal. A PSS score between 12 and 21 indicates that the stress experienced by patients is mild, showing it has been adequately managed. Stress is moderately managed when the score ranges from 21 to 26 (moderate stress). PSS >26 corresponds to an inadequately managed stress (severe stress) (9).

Treatment

According to the HEMII-pH findings of reflux, patients benefited from a three-month treatment combining antireflux diet, proton pump inhibitors (PPIs; pantoprazole 20 mg once daily), alginate (Gaviscon® 3/d, Reckitt Benckiser, Slough, UK) or magaldrate (Riopan® 3/d, Takeda, Zaventem, Belgium) (6). Patients with acid reflux benefited from pantoprazole and post-meal alginate, while those with non-acid reflux were treated with post-meal magaldrate or alginate. Individuals with weakly acid reflux received a combination of pantoprazole and post-meal alginate or magaldrate. Patients with nighttime reflux at the HEMII-pH tracing benefited from an additional alginate or magaldrate (alkaline LPR) at bedtime (6).

At the first consultation, patients were invited to specify 'refluxogenic' foods and beverages that they commonly consumed through a predefined list (10). The antireflux diet was based on the reduction of foods and beverages associated with a high risk of reflux (10), and the consumption of high-protein, low-fat, alkaline, plant-based foods and beverages (6, 10).

Three months after treatment, patients were invited to specify which foods and beverages they succeeded to decrease or stop. Medications were titrated at this time regarding the three-month RSS-12, considering a reduction of >20% of the baseline RSS-12 as a therapeutic response.

Lockdown evaluations

Patients were invited to evaluate the influence of the lockdown on both the diet adherence and stress level through a short patient-reported outcome questionnaire throughout the follow-up period (Supplementary Material 1).

Statistical analyses

Statistical analyses were performed with the Statistical Package for the Social Sciences for Windows (SPSS version 24.0; IBM Corp, Armonk, NY, USA). Wilcoxon rank test was used to evaluate the evolution of clinical outcomes from baseline to three-month post-treatment. Spearman analysis was performed to assess the relationship between outcomes. A p-value < 0.05 was considered significant. ❑

RESULTS

Thirty-two patients met the inclusion criteria and completed the evaluations. The mean age of patients was 50.5 ± 16.4 years. There were 22 females and 10 males. The clinical features of patients are described in Table 1. The RSS-12 significantly improved from baseline (66.6 ± 49.1) to three-month post-treatment (47.6 ± 39.2; p=0.008). The pre-treatment RSA (24.2 ± 11.2) significantly improved at three-month post-treatment (20.3 ± 9.5; p=0.031). Twenty-five patients (78.1%) reported a significant symptom reduction (>20% reduction of baseline RSS-12) at post-treatment time and were considered as responders (Table 1).

Influence of lockdown

The pre- to post-lockdown evolution of patient consumption of 'refluxogenic' foods and beverages is described in Table 2. According to the Wilcoxon rank test, patients significantly reduced their consumption of most foods and beverages associated with a high risk of reflux event. Eleven patients (34.4%) reported that the adherence to antireflux diet was better than initially presumed thanks to the lockdown period, while 14 (43.8%) believed that the lockdown did not impact their adherence to diet (Figure 1A).

The mean PSS at the end of the lockdown was 28.3 ± 8.8, which corresponded to a high level of stress regarding normative data (threshold 12.8 ± 6.2) (8). More precisely, only one patient reported PSS < 13. According to the PSS, 5, 6 and 20 patients reported mild, moderate and severe stress, respectively. Three patients (9.4%) thought that the lockdown period was associated with a better decrease of stress than ini-

TABLE 1. Cohort characteristics

Characteristics	N=32 patients
Mean age (SD)	51.8 ± 17.7
Body mass index	25.1 ± 4.7
Gender (N, %)	
Male	10 (31.3)
Female	22 (68.7)
Gastrointestinal endoscopy	N=21
Normal	2 (9.5)
Hiatal hernia	7 (33.3)
LES insufficiency	13 (61.9)
Esophagitis	11 (52.4)
Gastritis	10 (47.6)
Helicobacter Pylori infection	1 (4.8)
Types of LPR at the HEMII-pH	
Acid LPR	15
Weakly acid LPR	10
Nonacid LPR	7
HEMII-pH feature (m ± SD)	
Pharyngeal acid reflux episodes	34.8 ± 36.1
Pharyngeal nonacid reflux episodes	24.4 ± 18.3
Pharyngeal reflux episodes upright	22.1 ± 15.8
Pharyngeal reflux episodes supine	3.7 ± 5.3
Pharyngeal reflux episodes (total)	57.3 ± 44.2
GERD	17 (51.5)
Percentage of time with distal pH<4	6.9 ± 14.5
DeMeester score	20.4 ± 41.7
Responder rates	N (%)
No response (chronic course)	7 (21.9)
Mild response	2 (6.2)
Moderate response	7 (21.9)
High response	12 (37.5)
Complete responses	4 (12.5)

GERD=gastroesophageal reflux disease;
HEMII-pH=hypopharyngeal-esophageal multichannel intraluminal impedance-pH monitoring;
LES=lower esophageal sphincter;
LPR=laryngopharyngeal reflux

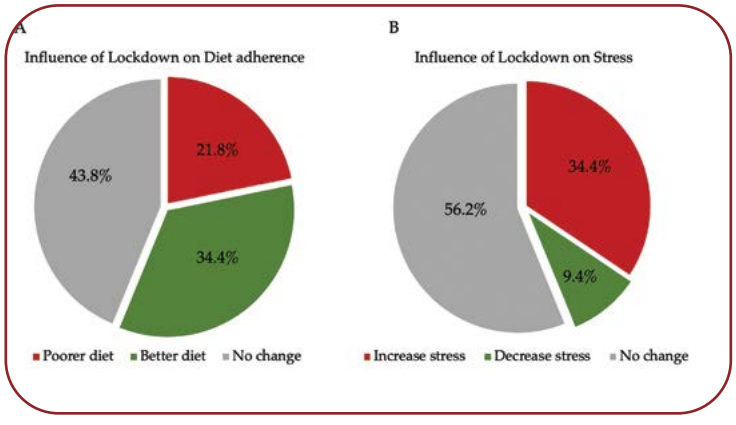

FIGURE 1. Evolution of stress management and diet adherence in lockdown period

tially presumed thanks to the lockdown period. Eleven patients (34.4%) believed that the lockdown period increased the stress level, while there was no influence of lockdown on stress in 18 patients (56.3%) (Figure 1B).

Overall, six patients (18.8%) reported that the lockdown had a negative impact of their LPR.

The PSS and RSS-12 scores at the end of the lockdown were significantly correlated (r_s=0.681; p<0.001). There was a positive association between the stress increase and the lack of adherence to diet at the end of the pandemic (r_s=0.367; p=0.039). ❑

DISCUSSION

The success of LPR treatment depends on many factors such as the adherence to low-acid, low-fat and high-protein diets and the management of stress and related autonomic nerve dysfunction (10). Many countries have forced the quarantining of some regions to limit virus spread (11-13), which have confined the citizens at home during several weeks. Regarding the high prevalence of LPR in populations (14, 15) and the impact of lockdowns on their eating habits and stress, we aimed to investigate how the lockdowns have influenced the therapeutic outcomes of LPR patients.

In the present study, we observed that LPR patients who were diagnosed just before the lockdown period adequately adhered to the antireflux diet, and mainly reported favorable or no impact of lockdown on their diet adherence. The positive or neutral impact of lockdown on patients' diet habits corroborated the findings of some previous studies (3, 16), while others reported a mitigated impact of lockdown on eating habits (4). In a recent meta-analysis of 42 studies, Della Valle *et al* found that 85% of studies measuring changes in Mediterranean diet adherence before-during lockdown reported an increased rate of change of high-adherence to the Mediterranean diet ranging from +3.3% to +21.9% (3). Similar findings were described by Alverez-Gomez *et al*, who found that the confinement period was associated with a better healthy lifestyle and dietary habits in the Spanish population, including an adequate consumption of fruits, vegetables and legumes as well as adequate time to prepare meals (16). The pre- to post-treatment specific analysis of diet changes in the present

TABLE 2. Baseline and pandemic diet habits of patients

	Pre-treatment			Pandemic			
Refluxogenic diet outcomes	**Weekly**	**Daily**	**Tot (%)**	**Weekly**	**Daily**	**Tot (%)**	**p-value**
Fat fish, fish oil (sardines, cods, herrings)	23	0	23 (71.9)	13	0	13 (40.6)	0.003
Fat chicken	17	0	17 (53.1)	1	0	1 (3.1)	NS
High-fat meat*							
Kidney	5	0	5 (15.6)	13	0	13 (40.6)	NS
Sheep meat	13	0	13 (40.6)	3	0	3 (9.4)	NS
Lamb meat	24	0	24 (75.0)	17	0	17 (53.1)	0.001
Bacon	17	0	17 (53.1)	7	0	7 (21.9)	NS
Beef meat	25	0	25 (78.1)	18	0	18 (56.3)	0.001
Porc meat	18	0	18 (56.3)	10	0	10 (31.3)	0.018
Ground	30	0	30 (93.8)	25	0	25 (78.1)	0.001
Pate	13	0	13 (40.6)	1	0	1 (3.1)	NS
Tripe	4	0	4 (12.5)	12	0	12 (37.5)	NS
Charcuterie	19	5	24 (75.0)	8	3	11 (34.4)	0.005
Chocolate	20	8	28 (87.5)	9	4	13 (40.6)	0.001
Chocolate cookies	20	6	26 (81.3)	9	3	12 (37.5)	0.001
Full-fat cheese	19	10	29 (90.6)	14	5	19 (59.4)	0.001
Whole milk	10	2	12 (37.5)	14	0	14 (43.8)	NS
Ice cream	25	1	26 (81.3)	15	0	15 (46.9)	0.001
Peanut, nut, cashew, hazelnut	23	1	24 (75.0)	11	0	11 (34.4)	0.007
French fries & frying	28	1	29 (90.6)	18	0	18 (56.3)	0.001
Shallot or onion	21	6	27 (84.4)	16	3	19 (59.4)	0.001
Spicy	16	15	31 (96.9)	17	8	25 (78.1)	0.001
Chilli	16	0	16 (50.0)	1	0	1 (3.1)	0.001
Tomato (sauce or raw tomato)	28	3	31 (96.9)	20	1	21 (65.6)	0.001
Strong alcohols	12	1	13 (40.6)	14	1	15 (46.9)	NS
Wines	15	8	23 (71.9)	10	4	14 (43.8)	0.001
Beer	12	4	16 (50.0)	6	2	8 (25.0)	0.014
Sparkling beverage (water, soda)	19	2	21 (65.6)	6	0	6 (18.8)	NS
Coffee	8	17	25 (78.1)	8	7	15 (46.9)	0.001
Tea	14	12	26 (81.3)	12	6	18 (56.3)	0.001
Orange, grapefruit or high-sugar juices	23	1	24 (75.0)	10	0	10 (31.3)	0.008
Sauces (mayonnaise, mustard, ketchup, etc)	30	1	31 (96.9)	20	0	20 (62.5)	0.001
Bakery	28	1	29 (90.6)	19	0	19 (59.4)	0.001
Sirup	9	2	11 (34.4)	2	0	2 (6.3)	NS
Butter products	16	12	28 (87.5)	10	8	18 (56.3)	0.001
Sweets	18	0	18 (56.3)	2	0	2 (6.3)	NS

The intake of these refluxogenic foods and beverages was significantly reduced during the lockdown period in terms of daily and weekly consumption.

study supports the fact that patients had significantly reduced their consumption of high-fat, high-quick-release sugar and refluxogenic foods and beverages, which was associated with symptom relief or significant reduction in LPR patients (11).

The pandemic situation may be associated with increased stress, anxiety and autonomic nerve dysfunction (17, 18). Autonomic nerve dysfunction may be characterized by a reduction of the vagus nerve activity on esophagus body and sphincters as well as an increased risk of pharyngeal reflux events. In LPR disease, it has been suggested that patients with stress and anxiety had impaired autonomic nerve function with higher heart rate variability than controls (2, 19). In that way, Wang *et al* reported that patients with anxiety or stress may have more severe LPR symptoms than those without significant autonomic nerve dysfunction. In the present study, patients reported mild-to-severe stress level and 34% of them mentioned a negative impact of

lockdown on stress. Moreover, 56% of patients did not report lockdown influence. Interestingly, the stress score was significantly associated with RSS-12 at the end of the lockdown, which supports the influence of stress on LPR disease.

The findings of the present study were particularly important regarding the potential increase of LPR-symptoms in COVID-19 (20). However, our study has some limitations. The low number of patients and the lack of objective testing of autonomic nerve dysfunction (e.g., heart rate variability device) were the primary limitations. However, it was difficult to include a bigger number of participants regarding the short period of study (lockdown periods) and the need to include patients with an objective LPR diagnosis (HEMII-pH). The lack of stress evaluation during the pre-lockdown period is an additional limitation. The use of HEMII-pH to confirm the diagnostic and the use of validated reflux and stress scale were the main strengths of the study. Indeed, the LPR diagnostic is complicated due to its non-specific symptoms and signs (20), and the related risk of false positive results. ❑

CONCLUSIONS

To the best of our knowledge, this is the first study describing lockdown influence on diet habits and stress of patients with LPR disease. Diet habits were improved or unchanged in most cases, while stress level was increased in one-third of patients. Those with a high level of stress related to the pandemic/lockdown situation reported high reflux symptom scores. The management of stress during the lockdown and pandemic periods is an important issue in LPR patients and needs future prospective controlled studies. ❑

Main points
- The diet habits were improved or unchanged in most LPR cases during lockdown.
- The stress level was increased in one-third of patients during the lockdown.
- Patients with a high level of stress related to the pandemic/lockdown situation reported high reflux symptom scores.
- The management of stress during the lockdown and pandemic periods is an important issue in LPR patients and needs future prospective controlled studies.

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References

1. **Lechien JR, Akst LM, Hamdan AL, et al.** Evaluation and Management of Laryngopharyngeal Reflux Disease: State of the Art Review. *Otolaryngol-Head Neck Surg* 2019;160:762-782. doi:10.1177/0194599819827488.
2. **Wang AM, Wang G, Huang N, et al.** Association between laryngopharyngeal reflux disease and autonomic nerve dysfunction. E*ur Arch Otorhinolaryngol* 2019;276:2283-2287. doi: 10.1007/s00405-019-05482-w.
3. **Della Valle PG, Mosconi G, Nucci D, et al.** Adherence to the Mediterranean Diet during the COVID-19 national lockdowns: a systematic review of observational studies. *Acta Biomed* 2021;92:e2021440. doi: 10.23750/abm.v92iS6.12233.
4. **Sarda B, Delamaire C, Serry AJ, Ducrot P.** Changes in home cooking and culinary practices among the French population during the COVID-19 lockdown. *Appetite* 2021;168:105743. doi: 10.1016/j.appet.2021.105743.
5. **Lechien JR, Chan WW, Akst LM, et al.** Normative Ambulatory Reflux Monitoring Metrics for Laryngopharyngeal Reflux: A Systematic Review of 720 Healthy Individuals. *Otolaryngol Head Neck Surg* 2022;166:802-819. doi: 10.1177/01945998211029831.
6. **Lechien JR, Bobin F, Muls V, et al.** Patients with acid, high-fat and low-protein diet have higher laryngopharyngealreflux episodes at the impedance-pH monitoring. *Eur Arch Otorhinolaryngol*

2020;277:511-520.
doi: 10.1007/s00405-019-05711-2.
7. **Lechien JR, Bobin F, Rodriguez A, et al.** Development and Validation of the Short Version of the Reflux Symptom Score: Reflux Symptom Score-12. *Otolaryngol Head Neck Surg* 2021;164:166-174. doi: 10.1177/0194599820941003.
8. **Lechien JR, Rodriguez Ruiz A, Dequanter D, et al.** Validity and Reliability of the Reflux Sign Assessment. *Ann Otol Rhinol Laryngol* 2020;129:313-325. doi: 10.1177/0003489419888947.
9. **Warttig SL, Forshaw MJ, South J, White AK.** New, normative, English-sample data for the Short Form Perceived Stress Scale (PSS-4). *J Health Psychol* 2013;18:1617-1628. doi: 10.1177/1359105313508346.
10. **Lechien JR, Bobin F, Mouawad F, et al.** Development of scores assessing the refluxogenic potential of diet of patients with laryngopharyngeal reflux. *Eur Arch Otorhinolaryngol* 2019;276:3389-3404. doi: 10.1007/s00405-019-05631-1.
11. **Leuzinger K, Gosert R, Søgaard KK, et al.** Epidemiology and precision of SARS-CoV-2 detection following lockdown and relaxation measures. *J Med Virol* 2021;93:2374-2384. doi: 10.1002/jmv.26731.
12. **Larrosa JMC.** SARS-CoV-2 in Argentina: Lockdown, mobility, and contagion. *J Med Virol* 2021;93:2252-2261. doi: 10.1002/jmv.26659.
13. **Belingheri M, Paladino ME, Piacenti S, Riva MA.** Effects of COVID-19 lockdown on epidemic diseases of childhood. *J Med Virol* 2021;93:153-154. doi: 10.1002/jmv.26253.
14. **Chen XM, Li Y, Guo WL, et al.** Prevalence of laryngopharyngeal reflux disease in Fuzhou region of China. *Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi* 2016;51:909-913. doi: 10.3760/cma.j.issn.1673-0860.2016.12.006.
15. **Kamani T, Penney S, Mitra I, Pothula V.** The prevalence of laryngopharyngeal reflux in the English population. *Eur Arch Otorhinolaryngol* 2012;269:2219-2225. doi: 10.1007/s00405-012-2028-1.
16. **Álvarez-Gómez C, De La Higuera M, Rivas-García L, et al.** Has COVID-19 Changed the Lifestyle and Dietary Habits in the Spanish Population after Confinement? *Foods* 2021;10:2443. doi: 10.3390/foods10102443.
17. **Dragioti E, Li H, Tsitsas G, et al.** A large-scale meta-analytic atlas of mental health problems prevalence during the COVID-19 early pandemic. *J Med Virol* 2022;9:1935-1949. doi: 10.1002/jmv.27549.
18. **Farì G, de Sire A, Giorgio V, et al.** Impact of COVID-19 on the mental health in a cohort of Italian rehabilitation healthcare workers. *J Med Virol* 2022;94:110-118. doi: 10.1002/jmv.27272.
19. **Huang WJ, Shu CH, Chou KT, et al.** Evaluating the autonomic nervous system in patients with laryngopharyngealreflux. *Otolaryngol Head Neck Surg* 2013;148:997-1002. doi: 10.1177/0194599813482103.
20. **Jiang G, Cai Y, Yi X, et al.** The impact of laryngopharyngeal reflux disease on 95 hospitalized patients with COVID-19 in Wuhan, China: A retrospective study. *J Med Virol* 2020;92:2124-2129. doi: 10.1002/jmv.25998.