Dental Disorders in Laryngopharyngeal Reflux Sufferers

Winny Yohana[1]*, Faisal Kuswandani[1]

1. Oral Biology Department, Dentistry Faculty of Universitas Padjadjaran, Bandung, Indonesia.

Abstract

Laryngopharyngeal reflux is an inflammatory condition of the upper aerodigestive tract tissues related to a direct and indirect effect of gastric contents reflux, which induces of upper aerodigestive morphological changes. Laryngopharyngeal reflux (LPR) enhances the proximal migration of gastric contents and may cause poor oral hygiene and dental disorder. The involvement of reflux in the development of dental disorders has been suspected for several decades. Reflux would be responsible for increasing the risk of oral mucosa inflammation, dental caries, and dental erosion.

This study aims to explore LPR sufferers who experience a lot of tooth loss which is thought to be due to reflux of the gastric content. The case report presented was a sixty-two-year-old female who suffered from laryngopharyngeal reflux and had poor oral hygiene with DMF 18 since three years ago. A general examination is quite good, she was taking lansoprazole, treatment planning composite filling on the teeth 14,13,11, 44.

In conclusion, dental disorders accompanied by laryngopharyngeal reflux, can be treated by taking care of the teeth thoroughly, maintaining oral hygiene, taking medication according to doctor's recommendations, and maintaining a lifestyle, diet, and exercise with the intention of the body being proportional.

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Introduction

Laryngopharyngeal reflux (LPR) is a state of backflow of gastric contents into the laryngopharynx, hypopharynx, and trachea-bronchi whereby this material comes in contact with the upper aerodigestive tract.[1] Laryngopharyngeal reflux is also called extraesophageal reflux, supraesophageal reflux, gastroesophagopharyngeal reflux, reflux laryngitis, silent reflux, and atypical reflux disease.[2] Laryngopharyngeal reflux is an inflammatory condition of the upper aerodigestive tract tissues related to a direct and indirect effect of gastric contents reflux, which induces the upper aerodigestive morphological changes.[3] The most common acid reflux disease, specifically GERD and LPR, are epidemics.[1,4] Gastroesophageal reflux disease (GERD) is the flow of stomach acid back into the esophagus. It is predictable that 4%-10% of patients presenting to an otolaryngologist practice have symptoms related to LPR.[5] Studies indicate that acid reflux is present in 50%-80% of asthmatic patients, 10%-20% of patients with chronic cough, up to 80% of patients with intractable hoarseness, and 25%-50% of patients with globus sensation.[6] In general, the population of people with LPR in the world is still quite high, around 28%-58%. Its prevalence in various parts of the world is quite high, in Italian countries it ranges from 60% with the highest age exposure between 30-39 years.[7] Nevertheless in China, the prevalence of LPR is lower.[8] In Indonesia, there is no data for this disease yet, but at the Sanglah Hospital Denpasar Bali, in 2015-2017 there were 61 cases, the ratio of women and men was 1.2:1 with the largest age group being 40-49 years.[9] The LPR is involved in the development of many otolaryngological diseases through the deposit of gastroduodenal enzymes into the mucosa of the upper aerodigestive tract. Thus, pepsin has been identified in the laryngeal,[10] hypopharyngeal,[11] oral,[12,] and nasal.[12] The involvement of reflux in the development of dental disorders has been suspected for several decades. Reflux would be

Corresponding author:
Dr. Winny Yohana,
Pediatric Dentist, Senior Histologist Lecturer, Department of Oral Biology, Dentistry Faculty of Universitas Padjadjaran, Bandung-Indonesia.
E -mail: winny.yohana@fkg.unpad.ac.id

responsible for increasing the risk of oral mucosa inflammation, dental caries, and erosion.[13,14] This article will discuss case reports from LPR sufferers with lots of tooth decay.

Case Report

The case report presented was a sixty-three-year-old female coming to a clinic who suffered from a dental disorder and neck pain, the patient was diagnosed with LPR by an otolaryngologist. She was sick since January 2019, in December 2019 for a month she was no sound, hoarseness, coughing, painful swallowing, and annoying cough. Extra-oral examination showed no abnormalities, the patient's facial profile was standard, and general medical history was good, No diabetes, no smoking, no consume alcohol, no halitosis. Intra-oral examination to evaluate any signs and symptoms, including dental erosion, aphthous lesions, erythema of the soft palate and uvula, glossitis, and mucous lesions. Dentin hypersensitive was assessed by inspection and test vitality. Tooth wear was also evaluated according to the tooth-affected surface regardless of its depth in dentin. Intra-oral examination: tooth erosion 42, 41, 31,32. Already lost 14 teeth then made removable prostheses on teeth 17,16,15, 24, 25, 26, 27,34, 35, 36, 37, 45, 46, 47. There are secondary caries on teeth 14, 13, 11, 44, (Figure 1).

Figure 1. Intra oral view of LPR sufferer.

There were no abnormalities in the oral mucosa. She was taking lansoprazole. In particular, each tooth, except the third molars, was examined on the five faces and scored from 0 to 3 (0= no erosive tooth wear; 1 = initial loss of surface texture; 2 = distinct defect, hard tissue loss < 50% of the surface area with possible exposure of dentine; 3= hard tissue loss > 50% of the surface area with systematic exposure of dentine.[15] Treatment planning composite filling on the teeth 14,13,11, 44, Dental caries status was scored according to the Decayed, Missing, and Filled teeth (DMFT) index. Teeth were classified as decayed teeth (DT) if there was evidence of cavitation of the crown or root. Missing teeth (MT), if absent, or filled (FT) if without secondary caries. The total DMFT score was given by the sum of DTs, MTs, and FTs. Second-degree erosion.[16] This patient's therapy on the teeth 44 root canal treatment follow-up composite filling and also treatment composite filling on the teeth 14,13,11 (Figure 2.)

Figure 2. After dental treatment.

Discussion

The larynx is part of the upper respiratory tract which is formed by several funnel-shaped cartilages and is located in the middle of the neck, anterior to the esophagus, and extends as high as the cervical vertebrae III–VI. In children and women, the position of the larynx is relatively higher. The larynx is generally always open, only occasionally closing when swallowing food.[17] The walls of the larynx are formed by nine pieces of cartilage consisting of 3 single cartilages, namely the thyroid, epiglottis, and cricoid cartilages, and 3 paired cartilages, namely the arytenoid cartilages, corniculate, and cuneiform. The larynx is a short airway, connecting the laryngopharynx and trachea. The larynx is the lowest part of the upper airway. The shape resembles a truncated triangular pyramid with the top being larger than the bottom. The upper limit of the larynx is the aditus of the larynx while the lower limit is the caudal limit of the cricoid cartilage.[17]

The laryngeal covered by epithelium, in the false vocal fold, is the ciliated pseudostratified columnar epithelium, whereas in the laryngeal true vocal fold is the nonkeratinizing stratified squamous epithelium. The upper part of the epiglottis, aryepiglottic folds, and fusiform fossa are covered by nonkeratinizing stratified squamous epithelium. The lower part of the false vocal cords, ventricles, and infra epiglottic area is covered by ciliated pseudostratified columnar epithelium.[18] The mucosa of the larynx contains numerous seromucous glands, especially numerous in the false vocal cords and ventricles. Mucous glands are abundant in the larynx, but the edges of the original vocal cords are entirely devoid of glands. In this case, the patient suffered from LPR and had lost 14 teeth over the four years since 2019, possibly LPR having an effect on dental disorders such as decayed teeth, poor oral hygiene, and generalized chronic gingivitis, eventually the damage got worse to fourteen teeth had to be extracted, and now there is more damage to the teeth with secondary caries on teeth 14, 13, 11, 44, consequently, the DMF increases to 18. This is in accordance with the statement that the prevalence of dental erosion in LPR sufferers is quite high, which is around 16% to 44%.[13,19-21] Treatment planning with composite fillings on the teeth 14, 13, 11, 44. According to the characteristics of oral microbiota, some patients would develop more frequently caries than others, due to complex interactions between microbiota, host, and environmental factors. LPR is associated with laryngopharyngeal and oral pH changes and involves the reflux gastric content, resulting in an easier dental disorder. The pH of gastric reflux is much less than 2.0. Meanwhile, hydroxyapatite crystals in the enamel of the tooth can dissolve through any acid with a pH of less than 5.

LPR physiology occurs due to pressure between positive intra-abdominal and negative pressure in the hypopharynx. Koufman demonstrated that laryngopharyngeal and gastroesophageal reflux are distinct in that each exhibits specific symptomatology; he also observed that the laryngeal epithelium is more susceptible to tissue injury than the esophageal epithelium.[13] This occurs as the larynx is covered by pseudostratified columnar epithelium, this thin epithelium cannot protect the mucosa from irritating the gastic content.[10-12] In normal people, the upper esophageal sphincter (UES) and lower esophageal sphincter (LES) work together simultaneously to prevent laryngopharyngeal reflux so that the main pathophysiology of LPR is related to esophageal sphincter dysfunction, especially UES. The UES consists of the cricopharyngeus, thyropharyngeus, and proximal cervical esophagus and is attached to the thyroid and cricoid cartilages, shaped like the letter C, which wraps around the cervical esophagus and is innervated by the pharyngeal plexus. When the UES is weakened, reflux occurs resulting in contact with the laryngopharyngeal segment, gastric acid and activated pepsin can cause direct damage to the laryngeal mucosa. This results from disruption of cleaning by the cilia on the pseudostratified columnar epithelium resulting in mucus stasis which can exacerbate mucosal irritation.[22] The components of reflux that play a role in causing pathological abnormalities in the larynx are acid, pepsin, bile acids, and trypsin. Pepsin with acid has been known to be the most dangerous component which is closely related to the occurrence of lesions in the laryngeal region.[23] In animal experiments in vitro, it was found that pepsin activation causes trauma to laryngeal cells up to a pH of 6. In patients with GERD, backflow of gastric content into the esophagus causes tissue damage or esophagitis and heartburn. Meanwhile, in patients with LPR, backflow of gastric content into the throat causes irritation and changes in the laryngeal mucosa. The cause of LPR is retrograde reflux of stomach acid, such as pepsin, which enters the upper esophageal tract and causes mucosal injury due to direct trauma resulting in damage to the cilia which causes accumulation of mucus. The activity of clearing the throat (throat clearing) and chronic coughing, over time, will cause lesions on the mucosa as well. According to a survey by the American Bronchoesophageal Association cited by Ford, the most common complaints obtained from the history of laryngopharyngeal reflux patients are throat clearing (98%), persistent coughing (97%), a lump in the throat (95%) and hoarseness (95%).[24] Other complaints include buccal burning, halitosis, otalgia, stridor, and loss of taste. LPR sufferers more frequently experience reflux during the day or in the standing position, whereas GERD patients usually suffer reflux at night and lying down.[25] We can present a typical reflux syndrome associated with reflux chest pain that is not from cardiac

disease, causing significant psychological disturbances. Significant and worsening quality of life. Assessment of the clinical symptoms of LPR patients according to Belafsky, there are nine components of a symptom index known as the Reflux Symptom Score (SGR) or reflux symptom index which are easy to implement and have good reliability and validity and can be completed in less than one minute. The scale for each component varies from a value of 0 (no complaints) to a value of 5 (severe complaints) with a maximum total score of 45 and an SGR with a value of > 13 is suspected of laryngopharyngeal reflux disease.[26] The most common clinical sign of laryngopharyngeal reflux disease is posterior laryngitis with erythema, edema, and thickening of the posterior wall of the glottis.[27]

LPR is the result of backflow of gastric contents into the larynx causing injury to the laryngeal and pharyngeal mucosa, Reflux Symptom Score (SGR) is used for the diagnosis and treatment plan for LPR. The most common initial medical therapy for LPR is proton pump inhibitors (PPIs). High doses of PPIs have shown the best effect in reducing reflux within 24 hours. Alkaline water and alginate showed a positive effect in reducing acidopeptidic activity in the larynx and pharynx. One type of PPI drug is lansoprazole. Lansoprazole medical therapy is used for about 8 weeks - 12 weeks. Pharmacokinetically, lansoprazole has higher bioavailability, and interactions with other drugs are less.[28] This is in accordance with the drugs given by the otolaryngologist in this case, and patients should have long-term treatment for 6 months because of the high sensitivity of the mucous membranes in the stomach and pharynx.

Patients with LPR symptoms are advised to adopt the right diet pattern so that the therapy runs optimally. Explaining to the patient about the prevention of reflux of gastric content is the key to LPR treatment. Patients will experience a reduction in complaints with healthy diet and lifestyle changes, for example, dietary patterns recommended for patients, such as eating the last 2-4 hours before lying down, reducing food portions, avoiding foods that reduce esophageal sphincter muscle tones such as fatty foods, fried foods, coffee, soda, alcohol, mint, chocolate, and fruit juices that are sour, vinegar, mustard, and tomato, as well as advising a strict low acid or acid-free (a strict low acid or acid-free) diet has been shown to have a real benefit in improvement. Other recommendations such as losing weight if the patient's weight is excessive, avoiding tight clothing, stopping smoking, elevating the position of the head when lying down 10-20cm, and reducing stress.[29]

Conclusions

Dental disorders accompanied by laryngopharyngeal reflux, can be treated by taking care of the teeth thoroughly, maintaining oral hygiene, taking medications according to Doctors' recommendations, and maintaining a lifestyle, diet, and exercise with the intention of the body being proportional.

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The article is original. It has never been published before.

Declaration of Interest

The authors report no conflict of interest.

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