Gastroesophageal Reflux Disease: Facts and Myths

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Abstract

Gastroesophageal reflux disease (GERD) is the most common digestive disorder. GERD occurs when the gastric contents experience retrograde flow to the esophagus causing troublesome symptoms. GERD symptoms can be typical, such as heartburn or regurgitation and atypical symptoms such as bloating, vomiting, or even nocturnal awakening. Although it has significant implications in the community, there are still many myths and misconceptions requiring scientific explanations. One of the famous myths about GERD is its relation to the acute coronary syndrome. Heartburn, the most common symptom of GERD, has no equivalent in many languages. Heartburn, in Indonesian patients, is often considered chest pain and misinterpreted with symptoms of the acute coronary syndrome. There are still many myths and misconceptions about GERD, such as whether GERD is similar to acid reflux, whether GERD is a hereditary disease, whether surgery can be performed on GERD, or something as simple as whether it is necessary to avoid fatty foods in GERD patients. Understanding the facts among these myths and misconceptions is important for clinicians because it affects how we educate, diagnose, and even manage GERD in patients. In this paper, we explain the GERD's facts and myths based on the latest studies and recommendations.

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Introduction

The gastric contents can pass in retrograde flow through the esophagogastric junction (EGJ) and lower esophageal sphincter (LES) from the stomach during postprandial. This retrograde flow is physiological, where in some people it can occur several times a day without causing symptoms. The presence of symptoms such as heartburn, regurgitation, bloating, or epigastric pain could indicate that the retrograde flow becomes pathological. This condition is known as gastroesophageal reflux disease (GERD), the most common digestive disorder that with a high prevalence in the world.[1]

GERD is defined as a condition that develops when the reflux of stomach contents causes troublesome symptoms and/or complications. Pathological processes can be derived from the esophagus, such as EGJ disorders, and may involve extra-esophageal components such as the stomach and nervous system. There are several conditions contributing to the pathophysiology of GERD. Studies have found that impaired esophageal clearance, reduced mucosal defense, increased frequency of TRLES or decreased LES pressure are considered responsible for GERD development.[2]

GERD can be assessed by symptoms, endoscopic findings, ambulatory pH monitoring, or newer diagnostic modalities, which have evolved significantly over the past decades. In patients with typical symptoms of heartburn or regurgitation, diagnosis of GERD can be established by clinical presentation or good response to proton pump inhibitors (PPI) trials.

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More examinations are needed for GERD patients with atypical symptoms or when the diagnosis remains in question despite a PPI trial.[2,3] Management of GERD consists of non-pharmacological, pharmacological, and surgery. Non-pharmacological includes lifestyle modifications, such as weight loss or head bed elevation. Meanwhile, pharmacological management includes the administration of antacids, histamine receptor antagonists, or proton pump inhibitors. Surgery is intended primarily for severe GERD or not responding to medication.

Although the prevalence is high, there are still many myths and misconceptions in the community that ultimately affect GERD's views. Myths and misconceptions about GERD include diagnosis, etiology, pathophysiology, or how GERD related to other diseases. Various questions can come from patients; therefore, they can influence how to diagnose and manage the disease. Having an understanding and knowledge, which are facts and myths about GERD, is essential to us as clinicians. In this paper, facts and myths about GERD will be presented based on the latest studies and knowledge.

1. GERD and acid reflux are same

GERD and acid reflux are related. They are often considered to be the same definition, but actually there are fundamental differences. Acid reflux is a physiological process occurring in the human body. Gastric acid involved in the process of human digestion may normally reflux or experience retrograde flow to the esophagus.[1] Acid reflux may occur several times a day without causing damage or triggers the disturbing symptoms. If the symptoms effects on individual's quality of life, it is called as the GERD.[2,3]

According to the World Gastroenterology Organization Global Guidelines, GERD is defined as troublesome symptoms sufficient to impair an individual's quality of life, or injury or complications resulting from the retrograde flow of gastric contents into the esophagus, oropharynx, and/or respiratory tract.[3] The Indonesian gastroenterology association defined GERD as a disorder of gastric contents reflux, repeatedly causing troublesome symptoms and or complications. The emphasis of the word "troublesome" is used to indicate impairment in the quality of life of patients.[2]

2. GERD only occurs in adulthood, especially in overweight

GERD is a disease that can affect all ages. The incidence of GERD in children is 0.84 every 1000 children each year with a peak incidence occurring at the age of 16-17 years.[4] GERD symptoms in children are different from adults, such as irritability, respiratory symptoms, failure to thrive, hematemesis and melena associated esophagitis, or feeding refusal.[5] In adult, the highest proportion of GERD is found at the age group ≥70 years (30%), and the lowest is in the age group of 15-19 years.[6,7]

One of the most common beliefs is that GERD often occurs in an obese person. This belief is based on being overweight and increasing intra-abdominal pressure, thus triggering a backflow of stomach acid. A study of 457 patients who underwent endoscopy in Korea found an association between body mass index (BMI) and erosive esophagitis findings. In obese patients, the LES pressure was lower than in patients with normal BMI.[8] The incidence of hiatal hernia as the risk factor for GERD is also more common in obese patients. Abdominal obesity can increase intra-abdominal pressure due to the transmission of the gravitational force of fat tissue into the abdominal cavity, incompetence of LES, and increased frequency of transient relaxation LES (TRLES). A theory also states there are abnormalities of neural and hormonal mechanisms causing delayed gastric emptying in obese patients.[9]

3. GERD is less prevalent in Asia

In the past, GERD is considered a disease that only affects Western countries because its incidence is very rare in developing countries. A systematic study has reported that the prevalence of GERD in Western countries was 10-20%, while in Asian countries the prevalence of GERD tended to be lower at 2.3-6.2%.[6] In the last two decades, the number of GERD cases and its complications were reported to be higher in Asia. Higher number of older people in population and increased awareness about GERD may contribute to this.[10] In Indonesia, the prevalence of GERD increased from 5.7% in 1997 to 25.28% in 2002.[2]

The different prevalence of GERD between countries is related to ethnicity

regarding the perception and interpretation of symptoms. Heartburn is a symptom of GERD that is not universally understood and has no translation in other languages. Other differences also contributing to differences in prevalence are diagnosis, difference interpretation of clinicians, gastric acid secretion, BMI, consumption of fatty foods, alcohol and smoking habits, socioeconomic conditions, and lifestyle.[11]

There is no accepted theory that could explain the differences regarding the pathogenesis of GERD between different ethnicity. However, several studies revealed that there is no difference in the GERD pathogenesis between Western and Asian populations. The lower incidence of GERD in Asian population could be explained by the less frequent underlying factors found in Asian. Asian also has lower gastric acid production due to smaller parietal cell mass.[12]

4. GERD is not a hereditary disease

Epidemiological study showed the presence of heartburn symptoms in the family lineage. It is supported by several studies about the role of genes in the development of GERD, Barrett's esophagus, and esophageal cancer. There are several single-nucleotide polymorphisms referred to as potential factors for GERD, such as ABHD10, RNF7, RASGFRF2, BTF3P7, C8orf4, GLDC, and ADAMTS.[10] Myth about GERD is not a hereditary disease turned out to be wrong because there is a genetic role in the development of GERD. Genetic factors can also explain phenotypic variations associated with the severity of GERD symptoms.[13,14]

5. Depression and anxiety may cause GERD

Studies examining the relationship between depression and anxiety with GERD have been widely conducted.[15,16] The Gut-Brain Axis concept states is bidirectional communication between the central nervous system and the digestive system, which involves the peripheral nervous system of the gastrointestinal tract, neuroendocrine, neuroimmune nerves, and the autonomic nervous system.[17] Psychological factors can influence the severity of symptoms of digestive system disorders, including in GERD, through the Gut-Brain Axis.[18]

A study examined the relationship of depression and anxiety in 19,099 subjects who underwent endoscopy. Subjects were divided into 4 groups, including erosive reflux disease, non-erosive reflux disease (NERD), asymptomatic erosive esophagus, and controls. The study found a relationship between anxiety and depression in GERD, especially in the NERD group.[15] Another study also found that the depression and anxiety also significantly increased symptoms of GERD, impairing the quality of life of GERD patients.[16]

6. An abnormal LES pressure is the only key etiologic factor of GERD

GERD is a multifactorial disorder caused by abnormal anatomical structures and the presence of comorbidities influenced by environmental and genetic factors.[17] Pathophysiology of GERD includes disturbed esophageal defense mechanisms, abnormal LES pressure, increased TRLES frequency, delayed gastric emptying, and hiatal hernia. The mechanism of esophageal defense is very important for preventing esophageal mucosal injury, including esophageal clearance and mucosal resistance. Esophageal clearance aims to neutralize acid reflux from the stomach with salivary and esophageal peristaltic. Several studies have shown that GERD patients have esophageal peristaltic dysfunction causing disruption of the esophageal defense mechanism.[18]

The mechanism of the valve between the esophagus and the stomach consists of the LES and anatomical structures, such as gastric sling and crural diaphragm. The purpose of this valve mechanism is to form a pressure of 15-20 mmHg above the intragastric pressure under resting conditions to prevent gastric reflux. Abnormality of LES pressure is related to the severity of esophagitis and the appearance of GERD complications, such as Barrett's esophagus.[17]

An abnormal LES pressure has been considered as the main cause of GERD, but in fact, the most common pathophysiologic in GERD is the increasing frequency of TRLES. TRLES is spontaneous LES relaxation for 10-60 seconds strongly influenced by gastric distention via proximal gastric strain stimulation.[17,18] Delayed gastric emptying actually has a small contribution to the occurrence of GERD. Increased intragastric pressure due to gastric distention increases the reflux of gastric contents associated with increasing postprandial TRLES.[19]

The prevalence of hiatal hernia in GERD

varies from 0.8% to 43.0%. Hiatus hernia can expand the diaphragm hiatus impairing the ability of the crural diaphragm to function as an external sphincter. Hiatal hernia can reduce LES pressure, increase the frequency of TRLES, and cause stomach contents to be trapped in the hernia sac and reflux proximal to the esophagus.[20]

7. Heartburn is the only sign of GERD

Heartburn is a common symptom often occurring in GERD. Heartburn is an uncomfortable sensation or pain in the chest due to acid in the esophagus. Heartburn gives a sensation of burning or heat in the middle area of the chest. Even though heartburn is a common symptom of GERD, but some patients have GERD without heartburn.[1,3]

Typical symptoms of GERD are heartburn, regurgitation, and hypersalivation, while atypical symptoms include nausea, feeling of rapid satiety, epigastric pain, bloating, vomiting, pain in the chest area, respiratory symptoms (such as coughing, wheezing, chronic rhinosinusitis), ear, nose, throat (ENT) symptoms, such as hoarseness and sore throat, dental erosions, halitosis, nocturnal awakening, or nightmares.[2,3]

8. GERD is usually be diagnosed based on the clinical presentation alone

In patients with typical symptoms such as heartburn and regurgitation, the diagnosis of GERD can be made by clinical presentation. However, in some patients with atypical symptoms, the diagnosis may require more extensive investigations, such as endoscopy, barium esophagogram, esophageal manometry, or ambulatory pH monitoring.[21]

The GERD questionnaire (GERD-Q) is a tool created to help diagnosing GERD and measuring therapeutic response. GERD-Q contains six questions related to the classic symptoms of GERD and its effect on the quality of life of patients. The GERD consensus recommends the use of the GERD-Q based on a study of more than 300 patients in primary care showing the GERD-Q gives a sensitivity of 65% and a specificity of 71%.[2]

Upper gastrointestinal endoscopy is the standard for diagnosing GERD with erosive esophagitis by mucosal breaks in the esophagus. Diagnosis criteria for NERD are the absence of mucosal breaks on endoscopic examinations, positive esophageal pH tests, and twice-daily PPI empirical therapy giving positive results. Endoscopy in GERD patients are mainly performed in patients with alarm symptoms. Ambulatory 24-hour pH monitoring or 48-hour capsules (if available) is very important not only for diagnosing NERD, but also to evaluate GERD patients who are not responding to PPI, evaluate patients with atypical symptoms before and after PPI therapy, and confirm the diagnosis of GERD before and after anti-reflux surgery. Recently, ambulatory 24-hour pH monitoring is generally considered the diagnostic gold for use in patient with GERD.[2,3,22]

PPI test is performed by giving double-dose PPI for 1-2 weeks without preceded by endoscopic examination. If symptoms disappear with PPI and reappear if PPI therapy is stopped, then a diagnosis of GERD can be established. The test to be positive if a clinical improvement within 1 week of more than 50%.[2] However, the PPI test is not recommended because of the low sensitivity and specificity.[3]

Urea breath test is also one method for diagnosing GERD, especially in populations with high prevalence of *Helicobacter pylori*. Esophageal biopsy plays a role in patients suspected Barret's esophagus. Meanwhile, esophageal manometry is used for detecting and diagnosing motility abnormalities in patients with no abnormalities on endoscopy or who have not responded to PPI, and in cases where achalasia or scleroderma is suspected.[3]

9. Avoiding fatty foods can reduce the symptoms of GERD

There are several theories trying to explain the relationship of fatty foods with GERD symptoms. Fatty foods increase the risk of esophageal reflux due to containing high calories and inducing secretion of bile acids causing esophageal irritants and influencing neurohormonal mediators affecting LES tone, cholecystokinin.[21] Physiological studies in humans have shown an increase TRLES and exposure to acids during eating high-fat foods. In contrast, a study on 12 healthy subjects showed no significant difference in LES tone, TRLES frequency, or number of reflux episodes among low-fat and high-fat group.[23]

Non-pharmacologic therapies in GERD are dietary management and lifestyle modification, including weight loss (if overweight),

avoidance of particular foods (chocolate, orange juice, coffee, peppermint, and tomato-based products) and/or alcohol drinks, avoidance of large meals, refrain from eating within 3 hours of going to sleep, smoking cessation, and head-of-bed elevation.[2,3,23] Evidence for efficacy of lifestyle interventions in GERD treatment shows only weight loss, smoking cessation, avoidance of alcohol drinks, and head-of-bed elevation significantly reduced GERD symptoms. Other lifestyle modifications still show mixed results on their effectiveness.[24]

10. GERD patients should not exercise.

Some exercises can worsen symptoms of GERD. Exercise is considered to reduce blood flow to the gastrointestinal tract, cause delayed emptying of the stomach, increase pressure contraction in the mid esophagus, and decrease esophagus peristaltic. However, exercised-induced GERD is also influenced by the intensity and duration of exercise and the food eaten before exercise.[25]

Some sports have a high risk of increasing symptoms of GERD, such as weightlifting, running, rowing, and cycling. There are no clear data yet whether other sports with low intensity can worsen the symptoms of GERD in general population. However, exercise also has advantages for GERD patients, especially for controlling body weight, therefore, avoiding exercise in GERD patients is not wise. Exercise can be done by modifying the time and intensity of exercise, avoiding high-risk sports that worsen symptoms of GERD, and modification of food intake before exercise.[26]

11. Smoking worsens GERD symptoms.

Several studies suggest that smoking worsens GERD symptoms.[27,28] Individuals who smoke more than 20 cigarettes a day increase symptoms of GERD compared to nonsmokers (OR 1.7).[27] Nicotine can reduce LES pressure causing gastric reflux into the esophagus. Nicotine can also reduce salivary production, one of the esophageal clearance mechanisms to neutralize stomach acid.[28] Smoking is also associated with increased inflammation.[29] In addition, smoking cessation can improve symptoms of GERD and improve quality of life. In this study, the group that successfully stopped smoking had 43.9% improvement in symptoms. The results of this study recommend that GERD patients stop smoking.[30]

12. There is no association between dinner-to-bed time and GERD.

The guidelines from the American College of Gastroenterology recommend that patients refrain from eating within 3 hours of going to sleep.[23] A shorter time interval between dinner time and sleep is significantly associated with GERD symptoms. After adjustment for smoking habits, drinking habits, and BMI, shorter dinner-to-bed time is associated with an increased risk of GERD. It is based on theory that the gastric distention after eating will cause an increase TRLES due to an increase of gastric reflux. However, the precise mechanism of the association between GERD and dinner-to-bed time interval is unknown.[31]

13. Proton Pump Inhibitors are the main medical therapy for GERD.

Medical therapy in GERD includes antacids, prokinetics, H2 receptor antagonists, Proton Pump Inhibitors (PPI), and Baclofen. Antacids were the first-line treatment for GERD in the 1970s because of the mechanism of GERD at that time due to excessive gastric acid secretion. Antacids are still effective in controlling symptoms of mild GERD.[32] H2 receptor antagonists (such as ranitidine, cimetidine, famotidine, and nizatidine) are effective in the treatment of mild esophagitis in more than 70% patients with GERD. They can also be used for maintenance therapy in preventing recurrence. A side effect of H2 receptor antagonists is the rapid development of tachyphylaxis which causes long-term use for GERD therapy with this agents is not recommended.[2,3]

PPI is the most effective therapy for relieving symptoms and healing esophagitis lesions in GERD. PPI is given when the diagnosis of GERD is made with the initial dose is a single dose per morning for 2-4 weeks before meals. If symptoms of GERD are still found (PPI failure), PPIs should be given in double doses up to 48 weeks.[2] If the clinical condition still does not show improvement, endoscopic examination is performed to obtain certainty of upper gastrointestinal mucosal abnormalities. For mild esophagitis, it can be continued with on demand therapy, while for severe esophagitis, it is continued with continuous maintenance therapy for up to 6 months.[2,3]

14. Surgical is not effective for treating GERD.

If medications are not able to reduce the symptoms of GERD, surgery can be performed. Generally, surgery is considered in patients with large hiatal hernia causing reflux and if there is evidence of cardia aspiration or dysfunction. Other indications are non-compliance with medical therapy, side effects associated with therapy, and refractory esophagitis due to medical therapy or persistent symptoms caused by refractory GERD.[2,3,33]

Standard surgical method for GERD is known as anti-reflux surgery. It involves a procedure called a fundoplication by wrapping fundus around the lower portion of esophagus to reinforce LES. Laparoscopic fundoplication is the gold standard for surgical treatment.[33] However, it must be ascertained whether medical therapy is optimal and check the patient's compliance. Until now, there has been no evidence to support anti-reflux surgery in Barrett's esophageal therapy or prevent progression towards esophageal carcinoma. Before performing anti-reflux surgery, all patients must undergo ambulatory 24-hour pH monitoring, esophageal manometry, endoscopy and barium swallow to rule out other possible diagnoses. Studies show that surgical therapy is very effective in treating GERD, especially in severe GERD or GERD that does not respond to medication. The success rate is over 90% with a follow-up of 10 years, showing high satisfaction from patients.[2,3,33]

15. GERD can lead to esophageal cancer.

About 10-15% of people with GERD can develop into Barrett's esophagus, the replacement of squamous epithelial cells in distal esophageal cells with the same columnar epithelial cells as the stomach lining. Barrett's esophagus has a 30-40-fold higher risk factor for esophageal cancer.[34]

GERD is a major cause of pathogenesis of Barrett's esophagus and influenced by other risk factors, such as central obesity, increased intragastric pressure, high levels of insulin and IGF-1, and increased leptin. Other risk factors such as a low-fiber diet, smoking, high levels of nitrites and bile acids have also been investigated as contributing to the development of Barrett's esophagus.[35] Frequent exposure of gastric content into the esophagus mucosa induces a genetic abnormalities that causes metaplasia, in which the actual underlying this process is a chromosomal instability. Genetic abnormalities were found 2% in Barret's esophagus and increase to more than 30% in esophageal cancer.[35,36]

Apart from Barrett's esophagus, other complications of GERD are erosive esophagitis and esophageal stricture. Erosive esophagitis occurs in 50% of people with GERD who are established through endoscopy. Under rare conditions, erosive esophagitis can cause ulceration resulting in hematemesis melena. Esophageal stricture is an advanced process of chronic esophagitis associated with the healing process of ulcers after esophagitis.[37]

16. GERD can cause heart attacks resulting in sudden death.

People often misinterpret GERD with a heart attack symptoms. GERD is indeed the most common cause of atypical chest pain. A clear history accompanied by investigations can distinguish symptoms of chest pain due to GERD and cardiac pain.[38] An epidemiological study of GERD symptoms shows that the symptoms of chest pain due to GERD are positively associated with food, retrosternal area pain, vomiting, burning sensation, and duration of pain less than 1 hour. The symptoms are negatively associated with pain associated with exercise, pain increasing with movement or breathing, and pain in the left chest.[39]

There is a case reported the relationship of GERD with acute coronary syndrome. In the case report, it was suspected that the patient had acute coronary syndrome due to increased oxygen demand due to uncontrolled GERD. Several studies have attempted to link GERD with non-ST segment elevation myocardial infarction (NSTEMI), where pain due to GERD can cause an increase in oxygen demand through adrenergic activity causes an increase in heart rate and blood pressure. Another mechanism is through the esophago-cardiac reflex, acid reflux in the esophagus can reduce oxygen supply to the myocardium. In this case, the patient had a previous history of heart disease due to uncontrolled GERD triggering the emergence of acute coronary syndrome.[40]

A study of GERD and angina found that the prevalence of chest pain due to coronary ischemia in GERD patients was 0.4%. Therefore, it is very important to pay attention to the possibility of coronary syndrome when evaluating

patients with symptoms of GERD.[41]

17. GERD can cause sleep disorders.

Some studies show there is a bidirectional relationship between GERD and sleep disorders. GERD can cause sleep disturbance due to reflux at the night causes awakening and most often occurs in stage 2 of the sleep phase. Frequent awakening period during sleep phase will affect the neuroendocrine system, especially the autonomic nervous system and hypothalamic pituitary adrenal axis. These conditions are mainly characterized by elevated sympathetic activity leading to poor sleep quality by increasing heart rate or blood pressure. In addition, comorbid factors also play a role in the relationship of GERD in causing sleep disorders. In patients who have a history of asthma, GERD can worsen asthma symptoms and cause disturbed sleep quality.[42,43]

Sleep disorders can also worsen symptoms of GERD through drugs used for sleep disorders, such as the benzodiazepine group. Benzodiazepines are known to reduce LES pressure and increase the frequency of acid reflux. In addition, several studies also show that sleep disorders can increase the sensitivity of the esophagus to acid exposure, thus sleep disorders are more at risk for GERD.[43,44]

18. GERD is curable.

Most patients with GERD can be cured. The occurrence of relapses due to discontinuation of medical therapy is a common occurrence and indicates the need for long-term maintenance therapy.[2,3] The Lotus Study compares long-term esomeprazole therapy with laparoscopic anti-reflux surgery in chronic GERD. Results of follow-up for 5 years showed that patients who received esomeprazole therapy and surgery are equally experienced improvement in symptoms and still in a state of remission within 5 years of follow up.[45]

19. GERD in pregnancy does not need to be treated.

GERD is a common during pregnancy with a prevalence of 30-50%. GERD symptoms are more severe in multipara compared to primipara, and if GERD symptoms occur during the first pregnancy, then it is more likely to occur in subsequent pregnancies. Endoscopic findings in cases of GERD in pregnancy are generally normal.[46]

Pathogenesis of GERD in pregnancy has been associated with hormonal and mechanical factors. Increased progesterone can reduce LES pressure, confirmed by several studies by measuring LES pressure.[47] Among 8 pregnant women with symptoms of GERD, LES pressure significantly decreased during the third trimester of pregnancy and returned to normal after delivery.[48] Mechanical factor also plays a role is abdominal cavity distention in pregnancy and it can interfere with the hiatus thereby increasing gastric reflux.[49]

Most symptoms of GERD in pregnancy can be treated with lifestyle modifications and the use of antacids if needed. Although PPI is considered safe for use in pregnancy, its use for pregnant women with severe symptoms of GERD. Meta-analysis study showed the PPI was not associated with an increased risk for major congenital abnormalities, spontaneous abortion, and premature delivery in pregnancy.[50]

20. GERD patients should not undergo Ramadhan fasting.

Ramadhan fasting is not merely the absence of food intake within a certain timeframe, but also not smoking, or avoiding alcohol consumption. Fasting can aggravate the symptoms of GERD because an empty stomach can increase stomach acid. In fasting, reduce smoking is a good factor for reducing the symptoms of GERD, but the short time between dinner and bedtime worsen the symptoms of GERD.[51]

Several studies have examined the effects of fasting on the symptoms of GERD. A study on 130 GERD patients who were divided into two groups found the symptoms of GERD were milder in the undergoing Ramadhan fasting compared to not fasting group.[51] In contrast, other study found no significant difference of GERD symptoms between fasting and not fasting group.[52]

21. GERD can cause asthma.

A study by the American Lung Association Asthma Clinical Research Center found 38% of asthma patients with GERD. The symptoms of GERD experienced in these patients are mostly pulmonary symptoms, such as coughing.[53] The mechanism of how GERD can cause asthma to date has not been clear because according to its

definition, asthma is a chronic inflammatory disease of the respiratory tract. GERD can indeed cause respiratory symptoms, such as disorders of the vocal cord or cough that can mimic asthma symptoms.[54]

It is not yet clear why GERD is common in patients with asthma. There are some studies in animals stating that acid reflux in the esophagus may stimulate vagal tone and increase respiratory resistance that cause bronchoconstriction. Chronic micro aspiration due to GERD can also stimulate bronchoconstriction and increase airway inflammation.[53] There is a theory explaining that pressure in the chest cavity (pressure swings) causes back flow of stomach acid into the esophagus. Beta agonists and theophylline also reduce LES pressure and cause acid reflux in asthma patients.[55]

Conclusions

Many issues in the community about GERD raises questions of whether they are myths or facts (Table 1). As clinicians, we are expected to explain myth or misconception about GERD based on scientific evidence from current guidelines and recommendations. This would be beneficial for education and treatment of GERD in patients we deal with.

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Declaration of Interest

The authors report no conflict of interest.

Facts and myths	Supporting evidence
GERD and acid reflux are same	Acid reflux is a physiological process occurring in the human body GERD is a disorder of acid reflux, repeatedly causing troublesome symptoms and or complications
GERD only occurs in adulthood, especially in overweight	GERD is a disease that can affect all ages In obese patients, the LES pressure was lower than in patients with normal BMI
GERD is less prevalent in Asia	A systematic study has reported that the prevalence of GERD in Western countries was higher than in Asia
GERD is not a hereditary disease	Several studies support about the role of genes in the development of GERD, Barrett's esophagus, and esophageal cancer
Depression and anxiety may cause GERD	Several studies found a relationship between anxiety and depression in GERD, especially in the Non-Erosive Reflux Disease (NERD) group
An abnormal LES pressure is the only key etiologic factor of GERD	Pathophysiology of GERD includes disturbed esophageal defense mechanisms, abnormal LES pressure, increased TRLES frequency, delayed gastric emptying, and hiatal hernia
Heartburn is the only sign of GERD	Heartburn is a common symptom of GERD, but some patients can have GERD with atypical symptoms, such as bloating, dental erosions, or sore throat
GERD usually be diagnosed based on the clinical presentation alone	Diagnosis of GERD can be made by clinical presentation only in patients with typical symptoms. In some patients with atypical symptoms, the diagnosis may require more extensive investigations
Avoiding fatty foods can reduce the symptoms of GERD	Studies about the effectiveness of avoiding fatty food to reduce GERD symptoms still show mixed results
GERD patients should not exercise	Exercise can be done by modifying the time and intensity of exercise, avoiding high-risk sports that worsen symptoms of GERD, and modification of food intake before exercise
Smoking worsens GERD symptoms	Nicotine can reduce LES pressure causing gastric reflux into the esophagus and also reduce salivary production, one of the esophageal clearance mechanisms to neutralize stomach acid
There is no association between dinner-to-bed time and GERD	Gastric distention after eating will cause an increase TRLES due to an increase of gastric reflux
Proton Pump Inhibitors are the main medical therapy for GERD	PPI is the most effective therapy for relieving symptoms and healing esophagitis lesions in GERD
Surgical is not effective for treating GERD	Surgical therapy is very effective in treating GERD, especially in severe GERD or GERD that does not respond to medication
GERD can lead to esophageal cancer	GERD can develop into Barrett's esophagus, which has a 30-40-fold higher risk factor for esophageal cancer
GERD can cause heart attacks resulting in sudden death	Several studies have attempted to link GERD with NSTEMI, where pain due to GERD can cause an increase in oxygen demand through adrenergic activity causes an increase in heart rate and blood pressure
GERD can cause sleep disorders	GERD can cause sleep disturbance due to reflux at the night causes awakening and most often occurs in stage 2 of the sleep phase
GERD is curable	Patients treated with PPI or surgery-maintained remission within 5 years of follow up
GERD in pregnancy does not need to be treated	Most symptoms of GERD in pregnancy can be treated with lifestyle modifications and the use of antacids if needed
GERD patients should not undergo Ramadhan fasting	Studies about the effects of fasting on the symptoms of GERD still show mixed results
GERD can cause asthma	The mechanism of how GERD can cause asthma to date has not been clear

GERD: gastroesophageal reflux disease; BMI: body mass index; LES: lower esophageal sphincter; TRLES: transient relaxation LES; PPI: Proton Pump Inhibitor; NSTEMI: non-ST segment elevation myocardial infarction

Table 1. Summary of facts and myths about GERD.

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