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6. Gastroesophageal Reflux Disease (GERD): Diet and Lifestyle Management

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6.1 Gastroesophageal Reflux Disease (GERD)

GERD is a chronic gastrointestinal disorder characterized by the regurgitation of gastric contents into the esophagus. It is one of the most commonly diagnosed digestive disorders resulting in a significant economic burden in direct and indirect costs and adversely affects the quality of life.

6.2 Objectives:

- Explain the pathophysiology of **gastroesophageal reflux disease**.
- Describe the signs and symptoms of a patient with **gastroesophageal reflux disease**.
- Describe the tests used to diagnose **gastroesophageal reflux disease**.
- Effect of life style and dietary habits on GERD.

6.3 Introduction:

Gastroesophageal reflux disease (GERD) is a condition in which the stomach contents (food or liquid) leak backwards from the stomach into the esophagus (the tube from the mouth to the stomach). This action can irritate the esophagus, causing heartburn and other symptoms. Gastroesophageal reflux disease occurs when the amount of gastric juice that refluxes into the esophagus exceeds the normal limit, causing symptoms with or without associated esophageal mucosal injury (Robbins et al., 1989). The esophagus is the tube that carries food from the throat to the stomach. GERD happens when a muscle at the end of the esophagus does not close properly. This allows stomach contents reflux, into the esophagus and irritate it. The lower portion of esophagus has a specialized muscle around it that usually stays tightly closed, opening only to allow food and liquid into the stomach. There is a band of muscles at the bottom of esophagus that act as a protective barrier against reflux material by contracting and relaxing and prevents reflux of gastric acid into the esophagus. If this barrier is relaxed at inappropriate times or otherwise compromised, reflux occurs. Chronic or reoccurring reflux permits prolonged contact of stomach content with the lower esophagus, leading to the symptoms like heartburn, chest discomfort, regurgitation, and cough. The entire problem is called gastro esophageal reflux disease (GERD) (Jackson, 2003).

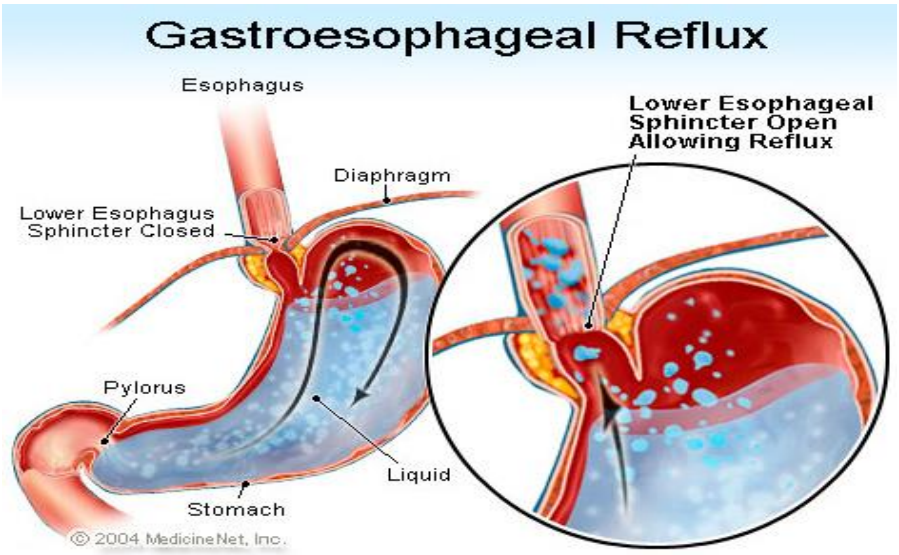


Figure 6.1: Gastroesophageal Reflux

6.4 Pathophysiology:

- ***Improper functioning of LES valve***- Proper LES function is the most important factor in preventing or limiting GERD. Several mechanisms are involved in LES dysfunction, the most common etiology of GERD, include transient relaxation of the LES. Consumption of tea/coffee, alcohol, chocolate and fatty meals can cause lower esophageal sphincter to relax and in this way contribute to GERD.
- ***Delayed gastric emptying***- It is another important factor proposed in the etiology of GERD. The postulated mechanism is an increase in gastric contents resulting in increased intragastric pressure and ultimately, increased pressure against the LES, this pressure eventually defeats the LES and leads to reflux (Ronnie, 2006).

6.4.1 Prevalence of GERD:

GERD is a chronic disease that affects a large proportion of adult population. It is considered to be the fourth most common gastrointestinal disease world wide with an estimated incidence of 6 per cent per year. Acid reflux seems to be much more common than they were a decade ago. The prevalence of weekly heartburn and other symptoms of acid reflux have risen nearly 50 per cent over the last decade. GERD is a highly prevalent disorder in all western countries with a remarkable increase of its related lethal and non-lethal complications (Holtman et al., 2004). In western countries about 20 to 40 percent of the adult population experience heartburn which is the cardinal symptom of this disease. GERD is thought to affect 10-20 million people in the United States. It is affecting approximately 40 per cent of American adults, men and women equally and the symptoms occur at least once per month (Isolauri et al., 1997). Endoscopic studies in Japan showed overall prevalence of reflux esophagitis among adult population to be 14-16 per cent (Fujimoto et

al., 2002). A population survey in Sweden, too found 18 per cent of the population showing symptoms of GERD.

The prevalence of GERD in Asian population is reported to be lower than that in western population. However, recent epidemiological studies suggest that the incidence of the disease is also increasing in Asian countries.

During the recent decade, several studies about the prevalence of GERD have revealed increase in number of GERD patients. A population based study conducted by Jung et.al, 2010 revealed the prevalence of GERD in Eastern Asia to be 2.5 per cent to 4.8 per cent before 2005 and 5.2 per cent to 8.5 per cent from 2005-2010.

Population based data on GERD are lacking from India. However, a study conducted by Kumar et al. (2008) showed prevalence of GERD in an urban adult population from northern India to be 16 per cent which was similar to other industrialized countries.

The researchers from All India Institute of Medical Sciences (AIIMS) conducted a population based survey and concluded that there is a high prevalence of GERD (19 per cent) in Indian population.

6.4.2 Risk Factors of GERD:

Although precise cause of GERD remains unidentified, there is considerable evidence that following factors may increase its risk.

A. Obesity:

A number of studies suggest that obesity contributes to GERD, and it may increase the risk for erosive esophagitis (severe inflammation in the esophagus) in GERD patients. Having a large amount of fat in the abdomen may be the most important risk factor for the development of acid reflux and associated complications such as Barrett's esophagus and cancer of the esophagus.

Researchers have also reported that increased BMI is associated with more severe GERD symptoms. Losing weight appears to help in reducing GERD symptoms.

Changes in gastro esophageal anatomy and physiology caused by obesity may explain the association between obesity and GERD. Obesity diminished LES pressure and increase intragastric pressure which could provoke reflux (David, 2007, Ronnie, 2006 & Friendenly, 2003).

Results of multiple studies indicate that GERD symptoms increased in severity with people gaining weight. Obesity satisfies several criteria for a causal association with GERD and some of its complications.

Study conducted by Brunilda et al. (2005) revealed overweight/obesity to be a risk factor for GERD which triggers or aggravates the symptoms. An epidemiological study conducted by Fock et al. (2008) too revealed overweight to be a risk for development of GERD.

High dietary fat intake:

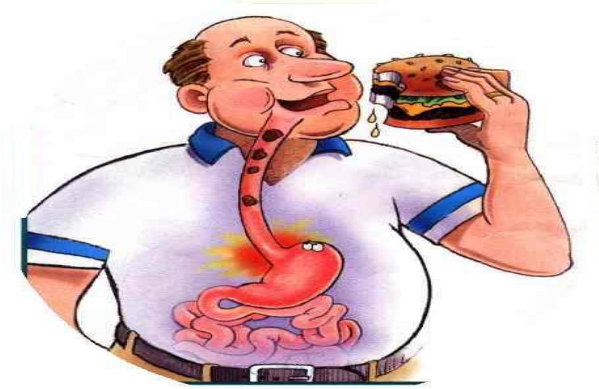


Figure 6.2: High Dietary Fat Intake

High fat foods remains in stomach longer. This makes the stomach produce more acid, irritating the digestive system. Fatty and greasy foods lead to a lazy and relaxed LES, they increases pressure in to the stomach which in turn puts more pressure on a weakened LES, allowing reflux of stomach contents. Brunilda et al. (2005) in their study found daily intake of total fat (including saturated fat) and cholesterol to be significantly higher in people with GERD symptoms. The fact that fatty foods lower the LES pressure has also been supported by Gillsonn (2008). He also revealed that erosions of esophagus were seen more frequently in those GERD patients who had significantly greater daily intake of total fat.

B. Smoking:

Increasing evidence indicates that smoking raises the risk for GERD. Cigarette smoking can weaken and relaxes the LES which is a valve at the junction between esophagus and stomach. Smoking decreases the strength of this valve thereby allowing stomach acids to reflux or flow backward into the esophagus. Further smoking also slows down the production of saliva. Saliva acts as a defense against damage to esophagus. It contains acid neutralizing chemical called bicarbonates. Researches showed that the saliva of smokers contains small amount of bicarbonates, which results in the body taking longer to break down harmful stomach acids (Schoenstadt, 2006). In addition to that, studies have also shown that smoking promotes the movement of bile salts from the intestine to the stomach which make stomach acid more harmful. Smoking stimulates the production of stomach acid and it directly injures the esophagus making it even more susceptible to further damage from acid reflux (Nocon et al., 2006). Wantanabe et al., 2003 too revealed smoking to be a possible risk factor of GERD.

C. Alcohol:

Alcohol has mixed effects on GERD. It relaxes the LES muscles and, in high amounts, may irritate the mucus membrane of the esophagus. A combination of heavy alcohol use and smoking increases the risk for esophageal cancer. Alcohol relaxes the muscle that keeps acid contained in stomach, disrupts the contractions in esophagus that aid swallowing and increases the amount of acid produced in the stomach. Alcohol increases the production of acid in the stomach. Intake of alcohol in moderation or excess was found to be associated with GERD (Watanbe et al., 2003., Nocon, 2006 & Gillson, 2008).

D. Tobacco:

Tobacco has been thought to decrease sphincter pressure and potentially worsen GERD symptoms. The tobacco connection in digestive problems stems from the nicotine in tobacco, which causes the lower esophageal sphincter, or LES, valve to relax, allowing stomach acids to flow up to the esophagus. This can cause heartburn, acid reflux, and in advanced stages of gastroesophageal reflux disease (GERD), possibly throat cancer and esophageal cancer. Tobacco chewing is long considered a culprit in causing GERD, and increases the risk of the disease by 70 per cent (Cheskin, 2006). Acid reflux is more likely to damage the esophagus in people who chews tobacco frequently, the damage will heal more slowly too and tobacco users are more likely to face complications of GERD (Kalenbatch et al., 2006).

E. Reflux trigger foods:

There are some specific types of foods which trigger reflux or worsen the symptoms of GERD. Gastroesophageal reflux disease is commonly considered to get worsened by consuming spicy foods and citrus fruit juices. These foods are known to cause irritation to sensitive esophageal mucosa and thereby worsen GERD symptoms. Carbonated drinks are a combination of acid, carbonation and caffeine that can aggravate GERD symptoms (Singh, 2010). Tea contains caffeine which stimulates gastric acid secretion and could aggravate reflux (Coffy, 1986). Peppermint and chocolates both causing the lower esophageal sphincter to relax and allow acid to flow back up to the esophagus, resulting in reflux (William, 1999).

6.4.3 Symptoms Related to GERD:

GERD can cause typical (esophageal) and atypical (extra esophageal) symptoms.

A. Typical Symptoms:

Typical symptoms of GERD included heartburn, regurgitation and dysphasia.

Heartburn It is the most common typical symptom of GERD. Heartburn is felt as a restrosternal sensation of burning or discomfort, which usually occurs after eating food or while lying down or banding over.

When acid refluxes back into the esophagus in patients with GERD, nerve fibers in the esophagus are stimulated. This nerve stimulation results most commonly in heartburn or burning type pain in lower part of the mid chest, which is a characteristic symptom of GERD. Heartburn may start high in the abdomen or may extent up into the neck. Since acid reflux is more common after meals, heartburn is common after meals. Heartburn is also more common when individual lie down because without the effects of gravity, reflux occurs more easily, and acid is returned to the stomach more slowly. Episodes of heartburn may occur infrequently or frequently but it tends to happen periodically. A population based study carried out on people in South Australia, suffering from GERD, showed half of them to have experienced the symptom of heartburn (Choys, 2005). In another study it has also been reported that patients experiencing heartburn, more than once in a week, are at a risk of developing GERD (Kaltnbatch et al., 2006).

- ***Regurgitation:***

Another common symptom of GERD is regurgitation or the sensation of acid backing up into throat or mouth. Regurgitation is the appearance of refluxed liquid in the mouth. It is an effortless return of gastric acid or esophageal content into the pharynx. Regurgitation can produce a sour or bitter taste, and may experience nausea and vomit of some stomach contents (Loffeld.,2001).

Regurgitation can induce respiratory complications, if gastric content spill into the tracheobronchial tree. It is one of the characteristic presentations of GERD (Philip et al., 2006). The prevalence of heartburn and/or regurgitation, considered to be reasonably specific symptoms for the diagnosis of GERD, ranged from 10 per cent to 48 per cent for heartburn, from 9 per cent to 45 per cent for regurgitation (Takayasu et al., 2000).

- ***Dysphasia:***

It occurs in approximately one third of GERD patients because of a mechanical stricture or a functional problem. This may be one of the more stressful symptoms for GERD patients because it increases difficulty with swallowing. The patients with dysphasia experience sensation of food being stuck particularly in the retrosternal area.

B. Atypical Symptoms:

GERD may manifest atypically with cough, wheezing and non cardiac chest pain. Patients with the following symptoms do not complain of the usual symptoms and are classified as ‘atypical’.

- ***Cough and wheezing:***

Cough and wheezing are the respiratory symptoms resulting from the aspiration of gastric contents into the trachea bronchial tree. Lung problems can develop when reflux causes stomach fluid to overflow into the breathing tubes.

This often occurs at night when a person is lying down and may cause wheezing (Stephens, 2006). GERD-related cough occurs predominantly during the day and in the upright position. It is often nonproductive and long-standing in nature. Cough may be the sole manifestation of GERD in more than 50 per cent of patients. GERD should be suspected in patients with cough whose symptoms have been chronic, not smokers and are not on any cough-inducing medications.

- ***Chest pain:***

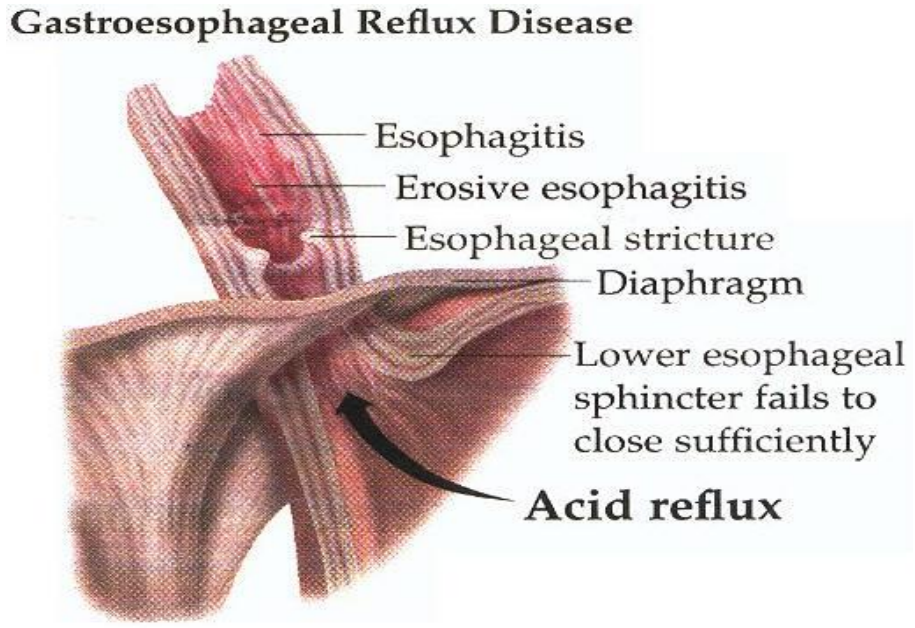
Non cardiac chest pain is a heterogeneous and complex disorder with many potential causes including GERD. The disease is probably the most common cause of non-cardiac chest pain. Approximately 20 per cent to 30 per cent of the patients with chest pain exhibit normal or insignificant cardiac catheterization findings and are classified as having 'noncardiac' chest pain. Recent data suggest that GERD may account for symptoms in 25 per cent to 55 per cent of patients with noncardiac chest pain (Vaezi, 2005). Direct contact of the esophageal mucosa with gastroduodenal agents such as acid and pepsin is the most likely cause of these symptoms.

Non cardiac chest pain has been common in Asia and GERD has also been frequently detected on the basis of non cardiac chest pain (Makkar et al., 2004 & Lin, et al., 2004).

- ***Enamel Decay:***

The pH of stomach acid is much lower than the critical pH of enamel dissolution; therefore, reflux of stomach contents into the oral cavity over an extended period of time can cause severe loss of tooth structure and can cause decayed enamel (David, 2009).

6.4.4 Complications of GERD:



If gastro esophageal reflux disease is not treated effectively the constant acid reflux can irritate the lining of the esophagus and serious complication can occur. Complications of GERD include the development of esophagitis, strictures, Barrett's esophagus and esophageal adenocarcinoma. Most of the mortality associated with GERD is not due to reflux but due to these complications.

- **Esophagitis:**

It is an inflammation and swelling in the lining of the lower end of the esophagus and is most often caused by acid-containing stomach contents refluxing back up into the esophagus.

It is the most common complication of GRED. In a period of 10 years the incidence of reflux esophagitis has almost doubled (Loffeld, 2001). Approximately 50 percent of the patients with GERD were found to develop esophagitis (Okoyoto et al., 2003 & Ollyo et al., 2000).

- **Stricture:**

An esophageal stricture is a gradual narrowing of esophagus and can lead to swallowing difficulties. Strictures are advanced form of esophagitis and are caused by circumferential fibrosis due to chronic deep injury.

Excessive acid is refluxed from the stomach up into the esophagus. This cause an inflammation in the lower part of esophagus, scarring will result after repeated inflammatory injury and re-injury. This scaring will produce damaged tissue in the form of a ring that narrows the opening of the esophagus (Jypee, 2006 & Malkezadh et al.,2003). Strictures can also result in dysphasia and short esophagus (Gillson, 2008).

- **Barrett's esophagus:**

The most serious complication of long standing or severe GERD is the development of 'Barrett's esophagus' (BE). Barrett's esophagus is a condition in which the tissue lining of the esophagus is replaced by tissue that is similar to the lining of the intestine.

This process is called intestinal metaplasia (Cameron, 2002). In Barrett's esophagus there is a metaplastic conversion of the normal distill squamous esophageal epithelium to columnar epithelium (Butter et al., 2001). GERD is a risk factor for Barrett's esophagus while improvement in GERD symptoms may lower the risk of developing Barrett's esophagus (Jypee, 2009).

- **Esophageal adenocarcinoma:**

Barrett's esophagus has malignant potential and is risk for the development of esophageal adenocarcinoma. It is a disease in which malignant (cancer) cells are formed in the tissue of the esophagus (Gillson, 2008). Patients with Barret's esophagus are 30 to 40 times more

likely to develop esophageal cancer than the average population (Jypee, 2009 & Butter et al., 2001).

GERD is a major risk factor for the development of esophageal adenocarcinoma, with rapidly rising incidence in U.S. (Philip et al., 2006). Recent study reported that in United States approximately 30 per cent of the cases of esophageal cancer can be linked to GERD (Sklar et al., 2003).

6.4.5 Prevention and Treatment of GERD:

GERD is a chronic disease, and the goal of treatment is to manage it; that means reducing the amount of acid in the stomach and the amount of reflux that occurs.

For mild GERD, this can sometimes be accomplished by using antacids and making certain dietary and lifestyle changes. Treatment of GERD involves life style changes, medications and surgery.

A. Life style and dietary changes:

This is the simplest form of treatment that uses a combination of life style changes and eating habits. The patient is advised to stop smoking, avoid alcohol and wear loose fitting clothes.

Foods such as chocolate, peppermint, alcohol, caffeinated drinks and fatty foods must be avoided since they promote reflux and reduce pressure in the sphincter. Carbonated beverages, spicy or acid containing foods such as citrus juices, aggravate the symptoms of GERD and should be avoided (William, 1999 & Robinson, 1986).

B. Medications:

- ***Antacids***

The dose of antacid is advised one hour after the meal to avoid symptoms of reflux and neutralize acid. Antacid may be aluminum, magnesium or calcium (usually calcium carbonate) based.

- ***Histamine antagonist:***

Histamine antagonists are advised to be taken 30 minutes after the meals. Some of the histamine antagonists prescribed are Cimetidine (Tagamet), Ranitidine (Zantac), Nizatidine (Axid) and Famotidine (Pepcid).

- ***Proton pump inhibitors (PPI):***

These medications shut off acid production more effectively and for a longer period. Some of the PPIs approved for treatments of GERD are Omeprazole (Prilosec), Lansoprazole (Prevacid), Rabeprazole (Aciphex), Pantoprazole (Protonix) and Esomeprazole (Nexium).

- ***Pro-motility Drugs:***

These drugs increase the pressure in LES and strengthen the peristaltic movements of esophagus thus reducing reflux of acid. Metoclopramide (Reglan) is a pro-motility drug approved for GERD.

C. Surgery:

Surgery becomes inevitable when drugs prove to be ineffective in treatment of GERD. Surgery is rarely recommended and done on only very few number of patients (American Academy of Medical Education, module-2, 2008).

6.5 Recommendations

- India stood out as one of the countries lacking national data on prevalence, features, severity of GERD and its relation with diet and life style.
- There is a need for carrying out research to assess population-based prevalence of GERD and risk factors.
- Impact of GERD on quality of life in the patients and whether treatment will lead to improved outcomes should be evaluated.
- Several factors such as:

  - Increasing obesity
  - Change in diet
  - Lifestyle pattern
  - Smoking
  - Tobacco chewing
  - Alcohol consumption
  - Stress
  - Use of specific foods

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