**The Benefits of 24-hours pH Monitoring**

The intensity of symptoms caused by reflux diseases ranges from mild discomfort and heartburn to frequent regurgitation, often resulting in dreadful complications. In order to establish the diagnosis of reflux diseases, a 24-hour pH monitoring technique is used. Esophageal 24-hour pH monitoring, also known as reflux impedance monitoring, is performed to measure the pH of the esophagus for 24 hours to correlate symptoms with reflux.

**Relevant Anatomy and Physiology**

Gastric acid, the HCl, formed by stomach cells, is essential for the digestion of proteins. The normal pH of the stomach ranges between 1.5-3.5, while that of the esophagus, pharynx, and larynx is much higher and falls towards the neutral end. A higher pH is important to protect the mucosa of esophagus, pharynx, and larynx as it is not specialized to withstand the acidic conditions stomach is designed for. The lower esophageal sphincter prevents the reflux of stomach contents into the esophagus, and its incompetency plays a major role in the pathophysiology of all reflux diseases, including laryngopharyngeal reflux (LPR) disease.

**The Procedure of 24-hour pH Monitoring**

For reflux testing, a catheter with dual sensor probes is used. The distal sensor reaches the lower end of the esophagus and measures pH while the proximal sensor is placed in hypopharyngeal region and measures LPR. The other end of the catheter is connected to a data recorder where it records any small fluctuations in the pH of the esophagus and shows it on the monitor.

In addition to the traditional dual-probe pH testing, wireless pH testing is another method used. In wireless pH testing, a chip like pH capsule is attached to the esophageal wall with the help of an endoscope, where it remains for 48 hours. It is connected to a wireless recording device, which gives readings of fluctuation in the pH of the esophagus. The traditional dual probe, however, is considered a gold standard and is widely used.

[**Interpretation**](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2912128/) **of Esophageal pH Impedance Monitoring:**

There are four subcategories defined according to esophageal pH detected by impedance during reflux, on the basis of which diagnosis is made and severity is established.

1. Acid reflux- decrease in pH to <4 (confirm definitive diagnosis of reflux)
2. Acid re-reflux- is superimposed acid reflux during the period of acid clearing when the pH is still <4 (before the esophageal pH recovers to >4)
3. Weakly acid reflux- pH is >4 but <7 during reflux
4. Weakly alkaline reflux- pH is either >7 or increases to >7 during reflux

 In healthy individuals, it is noted that about 40 episodes of reflux occur normally over a period of 24 hours. Acid reflux is twice as common as re-reflux while weakly acid and weakly alkaline reflex are rarely seen.

**The Benefits of 24-hour pH Monitoring:**

The test is performed when the symptoms, such as heartburn and regurgitation, do not respond to medicine. Sometimes it is used to evaluate and correlate atypical symptoms of reflux disease like cough, chest pain, wheezing, sore throat, hoarseness, to a decreased pH. The [benefits](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6236049/) of 24-hour pH monitoring are described below.

* **Highly sensitive**: It is considered a gold standard procedure for the diagnosis of reflux disease because it is a highly sensitive test. During 24-hour monitoring, even slightest changes in the acidity of the esophagus are noted. It is often combined with esophageal manometry (noticing movements of esophageal muscles) to give more accurate results.
* **Detection of other fluids:** pH monitoring detects not only acidic fluids but also non-acidic stomach fluids. This helps in determining the severity of the disease. The additional burden of non-acidic fluid and stomach contents, which contain digestive enzymes, may accelerate the destruction of the esophageal, pharyngeal or laryngeal mucosa.
* **Before acid reflux surgery**: Patients with the refractory disease need surgery to cure acid reflux. Before this surgery, many tests are performed as a standard protocol. These tests are upper gastroesophageal endoscopy, manometry, and 24 hours pH monitoring. The benefit of 24-hour pH monitoring for [Preoperative Esophageal Evaluation](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3977645/) is that it provides objective evidence of reflux disease and excludes esophageal hypersensitivity.
* **Deciding effective medicine:** The atypical presentation of reflux disease can be challenging. It also becomes difficult to suggest an appropriate medicine for these patients. Therefore, pH monitoring is crucial to not only confirm the diagnosis but also guide the selection of medicine according to the severity of reflux.