

# Non-Cardiac Chest Pain

## Overview

### What is Non-Cardiac Chest Pain?

Non-cardiac chest pain (NCCP) is a term used to describe chest pain that resembles heart pain (also called angina) in patients who do not have heart disease. The pain typically is felt behind the breast bone (sternum) and is described as oppressive, squeezing or pressure-like. It may radiate to the neck, left arm or the back (the spine). It may be precipitated by food intake. It lasts variable periods of time and it is not unusual for it to last hours. Patients may also complain of associated reflux symptoms such as heartburn (a burning feeling behind the breast bone) or fluid regurgitation (a sensation of stomach juices coming back toward the chest and even to the mouth frequently with a bitter or sour taste).

### Should I be worried that I am having a real heart attack?

Because the pain is similar to heart pain (called angina), patients and physicians frequently attribute this pain to the heart. In fact, many patients present to emergency rooms concerned about a heart attack and commonly undergo cardiac studies (such as EKGs, laboratory tests, stress test and even coronary angiography –where dye is injected into the heart vessels). After these cardiac tests fail to show evidence of heart disease, the patients receive the diagnosis of NCCP, leading the physician to examine other causes for this chest pain.

### Why is Cardiac and NCCP similar?

The heart and the esophagus are located in the chest cavity (thorax) in close proximity (figure 1). They receive very similar nerve supply. Thus, pain arising from either organ travel through the same nerve sensory fibers to the brain. As a result, the pain from either organ can have very similar features making it difficult to differentiate cardiac pain from esophageal (swallowing pipe) pain. It also indicates that a very common source of chest pain (non-cardiac) arises from the esophagus.

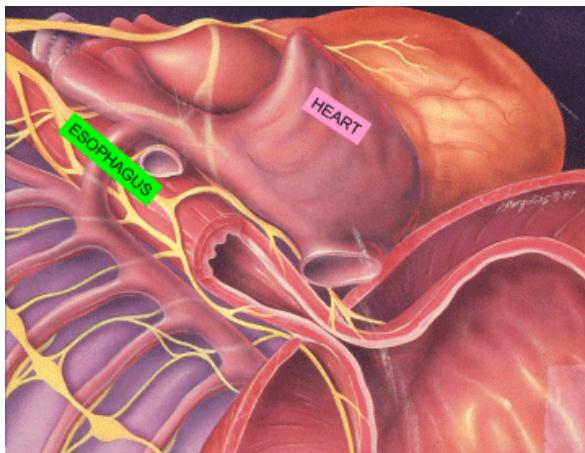


Figure 1. The heart and the esophagus are located in the chest in close proximity and also share same sensory nerves.

### Are there other names that this disorder goes by?

A variety of names have also been used in describing patients with NCCP. You may hear your doctor or other health care professional call it: "atypical chest pain, chest pain of undetermined origin, unexplained chest pain, functional chest pain, soldier's heart, irritable heart, sensitive heart, neurocirculatory asthenia, DaCosta's syndrome, and chest pain with normal coronary angiograms".

### Is this a common disorder?

NCCP is a very common problem of international proportions. Population studies have shown that in the United States as many as 69 million patients (23% of the population) suffer from NCCP. Similar figures have been described in Australia (33%), Spain (8-28%), Argentina (24%), and South China (21%).

### How will this affect my life?

Patients with NCCP are more likely to be gainfully employed and lose an average of 13 days of work/year, which is average for patients with other functional GI disorders (like irritable bowel) but certainly higher than those without this disorder.

### What are the causes of NCCP?

The sources of NCPP can be grouped into esophageal and non-esophageal. Several studies have shown that approximately 60% or more of patients with NCPP suffer from esophageal pain (mostly due to acid reflux commonly referred to as Gastroesophageal Reflux Disease (GERD).

Therefore, patients having chest pain who have had a negative cardiac evaluation are frequently referred to gastroenterologists (digestive disease specialists) to evaluate the esophagus as source of their chest pain.

### **1. Esophageal Sources of NCPP:**

#### **1. Gastroesophageal Reflux Disease (GERD) or acid reflux**

By far the most common cause of esophageal NCPP is gastroesophageal reflux disease also known as GERD or acid reflux. In addition to chest pain, patients may complain of heartburn and or regurgitation or chest pain alone may be due GERD.

#### **2. Esophageal contraction disorders as cause of NCPP:**

Other esophageal causes of chest pain include disorders of esophagus muscle (esophageal motility disorders) such as uncoordinated muscle contractions (esophageal spasm), contractions of extremely high pressure (nutcracker esophagus), and occasionally a disorder characterized by absence of esophageal muscle contraction due to loss of nerve cells of the esophagus (achalasia). It is important to recognize particularly achalasia since it is a treatable disorder.

#### **3. Visceral (esophageal) Hypersensitivity:**

Patients with NCPP may also have "visceral hypersensitivity" that is an esophagus where the smallest change in pressure or exposure to acid may result in tremendous pain. This is best explained by describing an experiment: when a small balloon is placed inside the (esophagus) and distended, patients with NCPP perceive the distension of the balloon at very low volumes. This is unlike healthy control subjects who do not experience this pain at all or may only have pain when the balloon distension reaches very large volumes. This phenomenon has been termed "Esophageal or visceral hypersensitivity" (enhanced esophageal perception or sensitivity to balloon distension). Although the cause of this increased sensitivity to balloon distension is unknown, there are treatment modalities that can be used to improve this exaggerated pain perception.

### **2. Non-esophageal Causes of NCPP**

NCPP is a common disorder with esophageal causes (described above) and nonesophageal related causes.

Non-esophageal sources that can cause NCPP include: Musculo-skeletal conditions of the chest wall or spine, pulmonary (lung) disorders, pleural illness (the layers of tissue that cover the lungs), pericardial conditions (the layer of tissue that protects the heart) and even digestive disorders such as ulcers, gallbladder, pancreatic diseases and rarely tumors (particularly in patients past age 50).

### **The Role of Stress:**

Some of patients with NCPP have also been found to suffer from stress that leads to disturbances such as depression, anxiety or panic disorder. It is unclear whether the stress disorder came first or the chest pain led to the appearance of an emotional disorder. Treatment of these conditions is an important component of treating chest pain.

### **What do I do if I've been treated for chest pain, but told I didn't have a heart attack?**

Patients suffering from chest pain must have thorough cardiac evaluations to ensure they do not have heart disease prior to being labeled as having NCPP. In addition, a variety of other disorders described above, both esophageal and non-esophageal must also be considered since specific treatment for these disorders are available.

### **Treatment:**

#### **1. Patients may be treated as if the NCPP was a result of having GERD:**

Once cardiac and other life-threatening conditions have been excluded and, based on the notion that the most common cause of NCPP is GERD a treatment trial is frequently considered.

Patients are often prescribed a proton pump inhibitor (PPI) also called a PPI trial. They must be taken at least 30-60 minutes before breakfast. It has been shown that this approach produces an approximately 80% response rate for patients with GERD-related NCPP. Some patients may also be given in addition to a PPI trial a medication called H2 Receptor antagonist (there are four types commercially available: Ranitidine, Famotidine, Nizatidine and Cimetidine, ) before bed, if symptoms occur at night or if the physician feels this course of therapy would be beneficial. This latter approach, however, has not been formally tested in scientific trials.

If the patient responds, the treatment can be continued for at least 8 weeks at a reduced dose such as Omeprazole (or equivalent) 20 mg twice daily about 40 min prior to meals. Other PPI's can be also employed and include (Esomeprazole, Lansoprazole, Rabeprazole, Pantoprazole)

#### **2. For patients not responding to a PPI GERD is the unlikely source of pain:**

For these patients, other medications are available. These medications are felt to produce their favorable effect by reducing pain transmission from the esophagus to the brain. The medications often used are low doses and are from the class of drugs known as tricyclic antidepressants (TCAs), and not used at the high doses employed for the treatment of depression.

Commonly used agents are amitriptyline, nortriptyline, desipramine, imipramine and trazodone. The two most commonly used agents are imipramine and trazodone. While for the most part they are safe, side effects may include sleepiness, dry mouth, blurred vision and urinary retention. Trazodone can also cause a sustained erection (called priapism), which is considered a medical emergency. Other categories of antidepressants – such as "serotonin receptor uptake antagonist" or SSRI" – can be tried if TCA are not tolerated because of side effects. Two recent reports suggest that the SSRI Sertraline may also have a beneficial effect in the treatment of NCPP. This medicine was found to be more effective than placebo (a sugar pill or

an inert substance) in the treatment of NCCP. New studies are also been done to explore other pain medications such as other SSRI's like citalopram. For patients not responding to either acid inhibition trial or TCA or other antidepressants, esophageal motility testing (a study done to evaluate the muscle contractions of the swallowing pipe) may be done to look for other uncommon causes of chest pain such as achalasia. This is particularly important since achalasia is a treatable disorder.

A number of studies continue to be done to better understand the mechanism(s) of pain in NCCP. Furthermore, new treatment agents are being investigated. A recent study suggested that receptors in the esophagus such as the so called adenosine receptors that may account for visceral pain in NCCP. Using a medication that acts on these receptors (Theophylline) a group of investigators showed it may be effective for the treatment of NCCP. However, side effects of this particular agent may limit its use. Thus, in the future newer medications that act on these adenosine receptors but that have a better margin of safety may provide new opportunities for the treatment of this challenging condition.

**3. Management of stress:**

If patients do not respond to the above approach or they suffer from depression, anxiety, and/or panic disorder, they should be referred for appropriate psychiatric consultation and treatment.

## Author

*Sami R. Achem, MD, FACP, FACG, AGAF, Mayo College of Medicine, Jacksonville, FL*

ACG PATIENT EDUCATION & RESOURCE CENTER

GI HEALTH CENTERS

©2012 American College of Gastroenterology

6400 Goldsboro Rd  
Ste 200  
Bethesda, MD 20817  
(301) 263-9000