

Non-Cardiac Chest Pain

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October 3, 2025

RECOMMENDED CITATION

mohammad looti (2025). *Non-Cardiac Chest Pain*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=33071>

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Primary Disciplinary Field(s): Medicine, Gastroenterology, Cardiology, Psychology

1. Core Definition and Clinical Presentation

Non-cardiac chest pain (NCCP) is a complex and often distressing condition characterized by chest discomfort that is not attributable to cardiac disease after thorough medical evaluation. It is critically defined by exclusion, meaning that all cardiovascular causes, including ischemic heart disease, must be rigorously ruled out before a diagnosis of NCCP can be established. This diagnostic process is paramount, as cardiac chest pain can be life-threatening, necessitating prompt and accurate differentiation. The pain associated with NCCP is frequently described as a **squeezing sensation** located behind the breastbone (retrosternal pain), which may exhibit radiation to other areas of the body, including the left arm, back, or neck. This pattern of radiation further complicates diagnosis, as it closely mimics symptoms commonly associated with angina pectoris, a hallmark of coronary artery disease.

The clinical presentation of NCCP can be highly variable, both in terms of its intensity and frequency. Patients may experience episodes ranging from mild discomfort to severe, debilitating pain that significantly impacts their daily lives. The duration of pain can also vary, from fleeting moments to prolonged periods, and it may be intermittent or persistent. Due to the symptomatic overlap with cardiac conditions, individuals experiencing NCCP often report considerable anxiety and fear, driven by the concern that their symptoms might indicate a serious heart problem. This psychological distress can, in turn, exacerbate the physical sensation of pain, creating a challenging feedback loop that clinicians must address.

Understanding the subjective experience of NCCP is crucial for effective management. While the pain is physically real, its non-cardiac origin places it in a broad category that encompasses various underlying etiologies. The perception of pain, its triggers, and its impact are profoundly individual, necessitating a patient-centered approach to diagnosis and treatment. Clinicians must gather a detailed history of the pain characteristics, associated symptoms, aggravating and alleviating factors, and the patient's psychological state to begin unraveling the complex picture of NCCP and differentiate it from more acute or life-threatening conditions.

2. Etiology and Pathophysiology

The etiology of non-cardiac chest pain is diverse, with a significant proportion of cases linked to **esophageal problems**. Foremost among these is gastroesophageal reflux disease (GERD), where stomach acid frequently flows back into the esophagus, causing irritation and inflammation. This acid exposure can lead to sensations of burning, pressure, or tightness in the chest, which are easily mistaken for cardiac pain. Other esophageal issues contributing to NCCP include

esophageal motility disorders, such as diffuse esophageal spasm or nutcracker esophagus, where abnormal muscle contractions within the esophageal wall lead to pain. These conditions result in disorganized or excessively powerful contractions that can trigger severe chest discomfort, often exacerbated by eating or stress.

Beyond esophageal pathology, a substantial number of NCCP cases stem from **problems related to the bones, muscles, and stomach**. Musculoskeletal causes are prevalent and include conditions like costochondritis (inflammation of the cartilage connecting ribs to the breastbone), muscle strains in the chest wall, or nerve impingement. Pain from these sources can be sharp, localized, and reproducible with movement or palpation, but it can also present as a diffuse ache. Gastric issues, such as peptic ulcers or gastritis, can also refer pain to the chest area, often described as a burning or gnawing sensation, particularly after meals. Diaphragmatic irritation or disorders affecting the gallbladder or pancreas can similarly manifest with chest pain, broadening the differential diagnosis beyond the esophagus.

Moreover, psychological factors play a significant and often underappreciated role in the development and perpetuation of NCCP. **Stress, depression, and anxiety are recognized as significant contributing factors**, capable of influencing visceral pain perception and motility patterns in the gastrointestinal tract. Emotional distress can lower the pain threshold, making individuals more sensitive to normal physiological stimuli within the esophagus or chest wall. The intricate connection between the brain and gut (the brain-gut axis) means that psychological states can directly impact digestive function and pain signaling, making a purely physical explanation for NCCP incomplete for many patients. This highlights the need for a holistic approach that considers both physiological and psychological dimensions of the patient's experience.

3. Diagnostic Approach and Differential Diagnosis

The diagnostic journey for non-cardiac chest pain invariably begins with the diligent exclusion of cardiac etiologies. Given the potential severity of underlying heart conditions, this initial phase is critical and often involves a comprehensive cardiac workup. This typically includes an electrocardiogram (ECG) to assess heart rhythm and electrical activity, blood tests to check for cardiac enzyme elevation (indicating heart muscle damage), and sometimes imaging studies such as echocardiography. For patients with risk factors for coronary artery disease, further investigations like stress tests (exercise or pharmacological) or even coronary angiography may be performed to definitively rule out myocardial ischemia or other structural heart abnormalities. It is only after these extensive cardiac evaluations yield negative results that the focus shifts toward non-cardiac causes.

Once cardiac involvement has been confidently excluded, the diagnostic process then targets potential gastrointestinal, musculoskeletal, and psychological origins. For suspected esophageal

involvement, diagnostic tools include upper endoscopy, which allows direct visualization of the esophageal lining to identify inflammation, ulcers, or structural abnormalities. Esophageal pH monitoring is employed to detect and quantify acid reflux episodes, confirming GERD as a potential cause. Additionally, esophageal manometry measures the pressure and coordination of muscle contractions within the esophagus, helping to identify motility disorders that could be responsible for the pain. These tests are vital for pinpointing specific esophageal pathologies that might be contributing to NCCP.

For other potential causes, a physical examination can often reveal musculoskeletal sources, with localized tenderness or pain reproducible on palpation. Imaging studies such as chest X-rays or computed tomography (CT) scans may be used to rule out pulmonary conditions or significant musculoskeletal abnormalities. Furthermore, a thorough medical history and psychological assessment are essential to identify contributing factors such as chronic stress, anxiety disorders, or depression, which can significantly influence pain perception and the overall clinical picture of NCCP. The diagnostic pathway for NCCP is often iterative and requires a multidisciplinary approach, combining expertise from cardiology, gastroenterology, internal medicine, and sometimes psychiatry or psychology, to arrive at an accurate diagnosis and effective management plan.

4. Management Strategies and Therapeutic Interventions

The management of non-cardiac chest pain is highly individualized and multifaceted, reflecting its diverse etiologies. For cases linked to esophageal problems, particularly GERD, pharmacological treatments are often the first line of defense. Proton-pump inhibitors (PPIs) are highly effective medications that significantly reduce stomach acid production, thereby alleviating the irritation and inflammation in the esophagus caused by reflux. Patients may require a trial of high-dose PPIs for an extended period to determine their efficacy in controlling NCCP symptoms. Alongside PPIs, other medications like H2 receptor antagonists may be used, or prokinetics to improve esophageal motility, though their role is generally secondary to acid suppression.

When esophageal causes are less clear or when there is a strong psychological component, other pharmacological agents come into play. Tricyclic antidepressants (TCAs), such as imipramine or desipramine, are often used at lower doses than those typically prescribed for depression. Their mechanism of action in NCCP is believed to involve modulation of pain perception pathways and reduction of visceral hypersensitivity, rather than solely acting as mood elevators. They can alter the way the brain processes pain signals from the esophagus and chest. For musculoskeletal causes, conventional **pain relievers**, including non-steroidal anti-inflammatory drugs (NSAIDs) or muscle relaxants, can provide symptomatic relief by reducing inflammation and muscle tension in the chest wall.

Beyond pharmacotherapy, several non-pharmacological and lifestyle modifications are crucial for managing NCCP. For GERD-related pain, recommendations include dietary adjustments (avoiding trigger foods like spicy items, caffeine, alcohol, and fatty foods), weight management, elevating the head of the bed, and avoiding late-night meals. For musculoskeletal pain, simple interventions like **stretching exercises** for the chest and shoulder muscles, combined with the application of a **heating pad** to the affected area, can significantly alleviate discomfort. When psychological factors are prominent, comprehensive care often includes psychological therapies. Stress management techniques, such as mindfulness, relaxation exercises, and biofeedback, teach patients coping mechanisms to reduce their overall stress burden, which can directly impact their pain perception and gastrointestinal function.

5. Psychological and Psychiatric Dimensions

The intricate relationship between the mind and body is profoundly evident in non-cardiac chest pain, where **stress, depression, and anxiety are frequently identified as significant contributing factors**. It is widely recognized that psychological distress can not only exacerbate existing pain but also lower an individual's pain threshold, making them more susceptible to discomfort from normal physiological processes within the chest. This bidirectional relationship means that while the pain itself can cause anxiety and depression, these emotional states can also intensify the perception and frequency of NCCP episodes. Patients with NCCP often report higher rates of panic disorder, generalized anxiety disorder, and major depressive disorder compared to the general population, underscoring the necessity of addressing these mental health comorbidities.

Given the strong link between psychological factors and NCCP, therapeutic approaches often incorporate mental health interventions. **Stress management techniques** are fundamental, equipping patients with strategies to cope with and reduce psychological stressors. These can include relaxation training, meditation, yoga, and mindfulness practices, all aimed at reducing autonomic nervous system arousal, which can impact visceral sensation. Furthermore, Cognitive Behavioral Therapy (CBT) is a highly effective structured psychotherapy that helps patients identify and challenge unhelpful thought patterns and behaviors related to their pain. CBT can teach individuals to reframe their interpretation of pain sensations, develop coping skills, and reduce fear-avoidance behaviors that might otherwise perpetuate the pain cycle. Other forms of therapy, such as hypnotherapy or psychodynamic therapy, may also be beneficial in addressing underlying psychological conflicts or traumas contributing to chronic pain.

The integration of psychological assessment and intervention into the overall management plan for NCCP is crucial for achieving optimal patient outcomes. Recognizing and treating co-existing psychological conditions can significantly improve pain control, reduce disability, and enhance the patient's overall quality of life. A multidisciplinary team, potentially including gastroenterologists,

cardiologists, pain specialists, and psychologists or psychiatrists, is often best equipped to provide comprehensive care. This holistic approach acknowledges that NCCP is not merely a physical symptom but a complex experience influenced by a multitude of physiological, psychological, and social factors. By addressing the psychological dimensions, clinicians can empower patients to gain a sense of control over their symptoms and improve their emotional well-being.

6. Prognosis and Impact on Quality of Life

While non-cardiac chest pain is not typically considered life-threatening, its prognosis is often characterized by a chronic and recurrent course. Many individuals experience persistent or intermittent symptoms over long periods, which can lead to significant distress and impairment in daily functioning. The unpredictable nature of the pain, coupled with the initial fear of underlying heart disease, can contribute to a cycle of anxiety and avoidance behaviors. This chronic pain state can severely impact various aspects of a patient's life, including their ability to work, engage in social activities, and maintain personal relationships, thereby diminishing their overall quality of life.

The psychological burden associated with NCCP is substantial. Patients frequently report elevated levels of anxiety and depression, which can be both a cause and a consequence of their persistent symptoms. The constant worry about the pain, its potential meaning, and its impact on future health can lead to a state of heightened vigilance and somatization, where psychological distress is manifested through physical symptoms. This psychological morbidity often complicates treatment, as patients may struggle with adherence to therapies or may not respond as effectively if their mental health needs are not adequately addressed. The fear of recurrence or the inability to find a definitive "cure" can foster feelings of helplessness and frustration, further exacerbating the psychological toll.

Despite the challenges, a comprehensive and integrated management approach can significantly improve the prognosis and quality of life for individuals with NCCP. By accurately diagnosing underlying causes, whether they are esophageal, musculoskeletal, or psychological, and implementing targeted therapies, symptoms can often be effectively controlled. Education about the benign nature of the condition (once cardiac causes are ruled out) and reassurance are vital components of care, helping to alleviate anxiety. Furthermore, engaging in stress reduction techniques, psychotherapy, and adherence to prescribed medications can empower patients to manage their symptoms and regain control over their lives. The goal of management is not only to reduce pain but also to restore psychological well-being and functional capacity, enabling individuals to live fulfilling lives despite a chronic condition.

7. Further Reading

[Noncardiac Chest Pain - Wikipedia](#)

[Gastroesophageal Reflux Disease - Wikipedia](#)

[Proton-pump Inhibitor - Wikipedia](#)

[Tricyclic Antidepressant - Wikipedia](#)

[Cognitive Behavioral Therapy - Wikipedia](#)

[Stress Management - Wikipedia](#)

[Esophageal Motility Disorders - Wikipedia](#)

[Costochondritis - Wikipedia](#)

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