

Evidence in Action

My Patient Has Chest Pain. How Should I Proceed?

By Charles N. R. Henderson, DC, PhD

A young woman comes to your chiropractic practice complaining of chest pain.

Chiropractors serve as a portal into the health care system in North America. This means patients usually come directly to you, a doctor of chiropractic, for care. The patient does not have to be referred to your office by another health care provider. Consequently, portal status places a considerable burden of responsibility on you. Chest pain may have a benign cause, or it may signal a life-threatening condition. As the portal clinician, you will evaluate and elect to treat this patient or refer her for further testing or specialized care. To make an informed decision, you take a thorough health history, perform an appropriate physical examination, order only necessary imaging studies and lab tests, and synthesize all of the resulting information into a working diagnosis and plan.

So, where do you begin?

You recently read an interesting review article about chest pain of somatic origin that was published by a non-chiropractic journal: *Stochkendahl MJ, Christensen HW. Chest pain in focal musculoskeletal disorders. Med Clin North Am 2010 Mar;94(2):259-73.* The article has useful information for each of the critical steps you must take as you provide evidence-based care for this patient.

The Condition History

Although chest pain may be due to potentially life-threatening causes, Stochkendahl et al. note that approximately 80 percent of the cases are benign, and of these benign cases, almost 50 percent have musculoskeletal causes. Chest pain from a musculoskeletal source is frequently characterized by a history of excessive strain (acute or repeated) or frank trauma. Also, musculoskeletal chest pain originating from the cervicothoracic spine region is commonly at-

tended by spine pain and discomfort. In addition, this chest pain is often sharper, of shorter duration, and associated with less frequent episodes than is typical of coronary-related angina. Stochkendahl et al. also note that the diagnostic value of pain exacerbation with general physical activity is unclear. Although patients with chest pain due to ischemic heart disease experience greater pain with increased physical activity, musculoskeletal chest pain can be exacerbated or relieved by physical activity. Several studies have reported that women suffer from musculoskeletal chest pain more often than men. The researchers also caution that although non-cardiac chest pain is not life-threatening, clinicians should not minimize its seriousness. When not properly diagnosed and treated, as many as 75 percent of these patients will experience persistent or recurrent symptoms. Moreover, this condition may cause chronic depression and anxiety with decreased daily activity and time loss at work.

Are there specific clinical tests you should perform or red flags you should look for?

The Physical Examination

These authors stress that the diagnosis and treatment plan for chest pain must be based on a careful integration of the condition history with a systematic physical examination. Manual palpation of the chest wall and cervicothoracic spine may reveal localized inflammation (heat, swelling, erythema, and pain), focal tenderness, and aberrant motion of ribs or vertebral segments. Figure 2 in the Stochkendahl et al. article identifies potential points of tenderness on the anterior chest wall. A neurological exam should be performed to rule out nerve root compression. Particular attention should be paid to pain exacerbation by movement or locally applied pressure.

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Special Studies and Specialist Referral

You recall that the Stochkendahl et al. article reported that 11 percent to 18 percent of patients referred for coronary angiography are subsequently classified as having musculoskeletal chest pain. This figure increases to 23 percent to 35 percent in patients who have normal coronary angiograms. However, if you suspect that the chest pain is caused by non-emergent cardiac or respiratory disease, referral for chest X-ray, electrocardiogram, or specialist examination is usually appropriate. Of course, if you suspect that the chest pain is due to a life-threatening condition such as acute myocardial infarction, initiating emergency care is the appropriate action. Cervical angina associated with specific disc pathology may be confirmed by magnetic resonance imaging.

What should you consider in your differential working diagnosis?

The Diagnosis

These authors note that musculoskeletal chest pain is a very broad diagnosis, encompassing many musculoskeletal sources and mechanisms. You recall that the article tabulated 20 diagnostic subgroups of musculoskeletal chest pain with proposed traumatic, nontraumatic, inflammatory, and noninflammatory mechanisms. Only degenerative pathology of the spine, psoriatic arthritis, spondyloarthropathies, and stress fractures provide clear pathoanatomical origins for musculoskeletal chest pain. Most other causes must be inferred from the history, clinical exam findings, and exclusion of other suspect conditions by imaging and lab studies. Moreover, there is no gold-standard test to confirm the diagnosis. The review identified 6 focal musculoskeletal disorders that are commonly diagnosed as causes of musculoskeletal chest pain:

- 1) **Tietze syndrome** – is characterized by painful swelling of the costal cartilages due to a benign inflammation. The swelling distinguishes it from costochondri-

tis. It affects the upper ribs of younger people, is not gender specific, and is single and unilateral in 70 percent to 80 percent of cases. The onset is insidious, often associated with a minor strain or injury produced from activities such as coughing or vomiting. It is no longer thought to be associated with a viral infection. The pain is usually self-limiting (resolving in weeks to months), but it may become chronic.

- 2) **Costochondritis** – is often called costosternal syndrome. There is pain with local tenderness, but not inflammation and swelling, at costosternal articulations and, sometimes, the xiphoid. It is a common cause of musculoskeletal chest pain (30 percent to 42 percent) reported from emergency room and primary care visits. Repetitive physical activity may precipitate it, but the pathogenesis is unclear. It also has a self-limiting course, but chronic and recurrent cases are common.
- 3) **Muscular tenderness** – is one of the most common causes of musculoskeletal chest pain. It involves the intercostals (approximately 50 percent of all chest pain cases) and/or pectoral muscles. This condition is usually attributed to unaccustomed or excessive activity, but a state of tension or anxiety can also precipitate it. The natural course of the condition was not described.
- 4) **Segmental dysfunction [subluxation]** of the neck and thoracic spine – is said to be one of the most underdiagnosed causes of musculoskeletal chest pain. It is reported to account for 14 percent of all patients with musculoskeletal chest pain and 29 percent of all patients admitted with acute chest pain that are suspected to have acute myocardial in-

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farction. This condition is characterized by decreased or aberrant motion of involved spine segments. Involvement of C4-C7 or T1-T8 may cause pain referral to anterior aspects of the chest wall. Chest discomfort originating from the cervicothoracic region is often called cervicothoracic angina. Trauma to or excessive strain of the involved joints is thought to be a common cause. According to Stochkendahl et al., international guidelines that follow a systematic classification scheme have shown promise as a tool for distinguishing between patients with cervicothoracic angina and true angina pectoris.

- 5) **Cervical angina** – is chest pain that resembles true cardiac angina but originates from cervical discopathy with nerve root compression. Unlike most other focal musculoskeletal disorders, this diagnosis can be confirmed by imaging studies.
- 6) **Slipping rib** – is also known as “rib-tip syndrome.” It is reported to account for approximately 5 percent of musculoskeletal chest pain cases seen in primary care practice. The slipping rib is said to be due to loosening of the fibrous attachments binding the lower costal cartilages to one another. It is thought that this allows the rib tip to curl upward and override the inner aspect of the rib above, impinging an intercostal nerve between the two ribs. This mechanical rib derangement should not be confused with rib-head slippage, which may occur at the articulation of the rib with the spine. Onset is insidious, with intermittent unilateral pain at the lower rib-cage margin. This condition resolves slowly (possibly taking several months).

What is the best evidence-based treatment approach?

The Treatment Plan

Stochkendahl et al. comment that once coronary angina has been ruled out and it has been determined that the chest pain is not of another visceral origin (typically lung, esophagus, or stomach), treatment is generally directed to one of the 6 focal musculoskeletal disorders listed above. However, it should be kept in mind that visceral and musculoskeletal causes are not mutually exclusive. A given patient may suffer from both. Your patient’s response to treatment is a critical diagnostic indicator.

These authors note that with the possible exception of cervical angina, musculoskeletal chest pain is known to be self-limiting within weeks to months, but it may become chronic. Reassurance, palliative heat, and manual therapy have been shown to be beneficial and will generally reduce anxiety and depression as well as limit unnecessary referrals for expensive clinical investigations. Refractive cases of Tietze syndrome have been treated with non-steroidal anti-inflammatory drugs (NSAIDs) and local steroid or lidocaine injections. Similarly, refractive costochondritis has been treated with local anesthetic injections for immediate relief and sulfasalazine for prolonged effect. However, there is no formal evidence for the effectiveness of these medical treatments. Chest pain due to muscular tenderness is best treated by removing precipitating causes (e.g., excessive or unaccustomed physical activity and coughing) and treating the localized muscle strain. Segmental dysfunction-associated chest pain, often identified as cervicothoracic angina, has been shown to respond to spinal manipulative treatment. The authors recommend that cervical angina, chest pain related to end-stage cervical spine degeneration with disc pathology, should be confirmed by

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magnetic resonance imaging and treated accordingly. Neurosurgical referral may be required. Stochkendahl et al. comment that chest pain caused by a slipping rib may be treated by reassurance and mild analgesics. Doctors of chiropractic have treated this condition using multiple manipulative/mobilization and rehabilitative techniques for many years, and anecdotal information indicates effective treatment occurs. However, there is limited evidence in the scientific literature demonstrating the effectiveness of these treatments. More research in this area is needed.

What does the Stochkendahl et al. article mean to you?

The article by Stochkendahl et al. provides a current overview of musculoskeletal-related chest pain with evidence-based guidance for the physical exam, diagnosis, and treatment. Chiropractors are portal health care providers who frequently see patients with neck, back, and chest pain. Therefore, they may play a key role in the initial evaluation and treatment of these patients. The observation that 23 percent to 35 percent of chest pain patients with normal coronary angiograms are subsequently classified as having musculoskeletal chest pain is indeed sobering. It suggests that improved initial evaluation and treatment could spare a large number of chest pain patients the stress of unnecessary and expensive clinical investigations, as well as prevent delay of appropriate treatment. ■

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Recommended Reading:

1. Brunse MH, Stochkendahl MJ, Vach W, Kongsted A, Poulsen E, Hartvigsen J, et al. Examination of musculoskeletal chest pain - an inter-observer reliability study. *Man Ther* 2010 Apr;15(2):167-72.
2. Christensen HW, Vach W, Manniche C, Haghfelt T, Hartvigsen L, Hoilund-Carlsen PF. Palpation for muscular tenderness in the anterior chest wall:

Important Terms

Stable angina pectoris – a coronary syndrome characterized by discomfort in the chest, jaw, shoulder, back, or arm that is often aggravated by exertion or emotional stress and may be relieved by rest or nitroglycerine.

Non-coronary chest pain – chest pain not associated with a coronary syndrome that has gastrointestinal, pulmonary, musculoskeletal, or undetermined origins.

Cervicothoracic angina – chest discomfort originating from the cervicothoracic region.

Rib-tip syndrome – chest pain resulting from intercostal nerve impingement when a lower rib tip curls upward and overrides the inner aspect of the rib above.

an observer reliability study. *J Manipulative Physiol Ther* 2003 Oct;26(8):469-75.

3. Christensen HW, Vach W, Gichangi A, et al. Cervicothoracic angina identified by case history and palpation findings in patients with stable angina pectoris. *J Manipulative Physiol Ther* 2005;28:303–11.
4. Christensen HW, Vach W, Gichangi A, Manniche C, Haghfelt T, Hoilund-Carlsen PF. Manual therapy for patients with stable angina pectoris: a nonrandomized open prospective trial. *J Manipulative Physiol Ther* 2005 Nov;28(9):654-61.
5. Kumarathurai P, Farooq MK, Christensen HW, Vach W, Hoilund-Carlsen PF. Muscular tenderness in the anterior chest wall in patients with stable angina pectoris is associated with normal myocardial perfusion. *J Manipulative Physiol Ther* 2008 Jun;31(5):344-7.
6. Stochkendahl MJ, Christensen HW. Chest pain in focal musculoskeletal disorders. *Med Clin North Am* 2010 Mar;94(2):259-73.