Clinical Integration of Osteopathic Manipulative Medicine

Family/Emergency Medicine: Musculoskeletal Chest Pain

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**Introduction:** Chest pain is a common complaint that necessitates immediate medical attention. In emergency departments (ED), chest pain is the second most common complaint amounting to six million visits annually in the United States. The underlying causes of chest pain symptoms are extensive and may stem from the heart, lungs, aorta, esophagus, stomach, mediastinum, pleura, and abdominal viscera, as well as the musculoskeletal system [1]. It is important for the clinicians in the ED to assess and exclude life-threatening causes of chest pain. Once these etiologies are ruled out, more benign causes may be considered. In the ED, 10 to 49 percent of adults and 20 to 25 percent of children with chest pain may be attributed to a musculoskeletal source [2,3]. In nonemergent settings, musculoskeletal chest pain seems to be more frequent than in emergent situations; chest pain may be present in 43 percent of patients in the primary care setting [5]. The symptom of chest pain is also seen in up to 30 to 45 percent of patients with negative post-coronary angiography results [6]. Musculoskeletal chest pain can be caused by somatic dysfunctions in the adjacent parts of the body. Conventional treatments include topical agents, NSAIDS, muscle relaxants, antidepressants, steroid or anesthetic injections, and narcotic analgesics. Osteopathic manipulative medicine (OMM) offers an additional modality of treatment that can address help differentiate and treat chest pain of musculoskeletal origin.

**Patient presentations:** Chest wall pain presents with an insidious onset. It is often described as sharp and localized, but may present as diffuse pain as well. Postural changes in position, deep breathing, and limb movements may also cause symptoms of chest wall pain. Clues that suggest musculoskeletal contribution are pain in the neck, thoracic spine, or shoulder that may cause referred pain to the chest [4].

Possible symptoms may include:
- Exertional pain
- Radiation to the neck or arms
- Numbness
- Fever
- Chills
• Cough
• Dyspnea
• Pain localized to atypical areas such as the axilla or midthoracic spine

**Differential diagnosis:**
Most causes of chest pain can be attributed to musculoskeletal, cardiac, gastrointestinal, pulmonary causes.

• **Musculoskeletal:**
  - Costochondritis
  - Chest wall pain after coronary artery bypass surgery
  - Rheumatic disease such as rheumatoid arthritis, anklyosing spondylitis, psoriatic arthritis, and fibromyalgia

• **Cardiac:**
  - Coronary artery disease
  - Coronary vasospasm
  - Valvular heart disease
  - Pericarditis
  - Myocarditis
  - Aortic dissection
  - Stressed induced cardiomyopathy

• **Gastrointestinal:**
  - Esophagitis
  - Gastroesophageal reflux disease
  - Achalasia
  - Esophagitis
  - Mediastinitis

• **Pulmonary:**
  - Pneumonia
  - Asthma
  - Chronic Obstructive Pulmonary Disease
  - Pulmonary embolism
  - Tension pneumothorax

• **Others:**
  - Stress fractures
  - Malignancy
  - Acute chest wall syndrome
  - Cocaine intoxication
  - Pheochromocytoma

**Clinical Pearls:**
History and physical exam evaluates the likelihood of musculoskeletal chest pain vs other causes. Look at medical history and risk factors and exclude life-threatening pathologies first.

The physical exam should be focused on heart, lungs and abdomen.

Common laboratory and imaging studies:
- EKG, cardiac biomarkers, BNP
- Spiral CT, D-dimer
- Chest X ray, CBC, BMP

The musculoskeletal exam should begin with range of motion of cervical spine and shoulders. Lumbar spine should be examined. Tenderness or pain in the thoracic spine with changes in posture points to musculoskeletal origin.

The most diagnostic sign is reproducible chest wall tenderness, which suggest chest wall syndrome.

**Osteopathic Manipulative Medicine (OMM) Integration:**

Musculoskeletal chest pain can be a result of a somatic dysfunction that can be efficiently treated with osteopathic manipulative treatment (OMT). In one study, a patient was treated with both OMT and conventional tests and therapy [8]. A common reason for hospital OMM consultations is chest/rib pain and respiratory infection. The most common techniques used were myofascial release, balanced ligamentous tension, muscle energy, soft tissue, and inhibition. Numerous studies have demonstrated that OMT has improved patient outcomes, as well as decrease the LOS in medical and surgical patients [9].

One published case study examined a 13-year-old male who presented with chest pain that worsened with inhalation. The patient had an anterior counterstrain tenderpoint at the anterior fifth rib, which was also elevated posteriorly, rotated and sidebent left. The physician utilized soft tissue mobilization of the ribs and thoracic spine and also treated utilizing counterstrain technique. After treatment, patient reported immediate relief of chest pain with no pain upon inhalation [10].

**Osteopathic Structural Examination:** Potential areas of somatic dysfunction in patients with chest wall pain:
- Thoracic spine
- Ribs
- Sternum
- Clavicle
- Shoulder
- Anterior Rib and Intercostal muscle tenderpoints

These are common areas of the body that can cause pain to the chest. Areas such as the neck and shoulder may cause referred pain. Treating structural dysfunctions allows us to restore function by minimizing musculoskeletal sources of chest wall pain.
Possible Treatment Options:

Osteopathic Manipulation Treatments should be applied to help address musculoskeletal restrictions to the rib cage to decrease muscle spasms and address the region of tenderness. The patient should be stable and fractures or other potential life threatening causes of chest pain ruled out first. Treatments should be gentle and tolerable by the patient.

- Balanced ligamentous tension
- Counterstrain
- Facilitated positional release
- Muscle energy
- Rib raising

References:

1. Hollander JE, Chase M. Evaluation of chest pain in the emergency department. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed on July 10, 2014.)