

REVIEW ARTICLE

CURRENT CONCEPTS IN COSTOCHONDRITIS

Anjum Ilahi, Mansur I, Amjed Younas

ABSTRACT

Costochondritis is one of the most common causes of chest pain a physician or a cardiologist is likely to come across in his clinical practice. Its importance in the differential diagnosis of chest pain cannot be underemphasized, yet it is a much under discussed topic in clinical literature. This review article is written to summarize the current state of understanding of this relatively benign but important condition.

KEY WORDS: chest pain, costochondritis, Tietze's syndrome, anterior chest wall musculoskeletal pain, Sore ribs, Costal chondritis

INTRODUCTION

Medical students usually first come across the term costochondritis as a part of the differential diagnosis of the various causes of chest Pain. Although this topic is not very well taught in the medical Schools but it is the one of the most frequent cause of chest pain a cardiologist or physician is likely to come across in his routine clinical practice. Often it is likely to be confused with anginal pain, as it too sometimes gets worsened with exertion as increased chest wall movements put an extra burden on the painful costochondral junctions. When confronted with the symptoms of chest pain there is the dilemma of both under diagnosis and over diagnosis of serious pathology. Over diagnosis implies Unnecessary and expensive investigations and long Retention in A&E department. Under diagnosis means missing serious life threatening conditions. The chest pain history itself has not proven to be a powerful enough predictive tool to obviate the need for at least some diagnostic testing. Combinations of elements of the chest pain history with other initially available information, such as a history of CAD, have identified certain groups that may be safe for discharge without further evaluation, but further study is needed before such a recommendation can be considered reasonable¹.

Although costochondritis is usually self-limited and benign, it should be distinguished from other, more serious causes of chest pain. Coronary artery disease is present in 3 to 6 percent of adult patients with chest pain and chest wall tenderness to palpation. History and physical examination of the chest that document reproducible pain by palpation

over the costal cartilages are usually all that is needed to make the diagnosis in children, adolescents, and young adults. Patients older than 35 years, those with a history or risk of coronary artery disease, and any patient with cardiopulmonary symptoms should have an electrocardiograph and possibly a chest radiograph because although certain elements of the chest pain history are associated with increased or decreased likelihoods of a diagnosis of acute coronary syndrome or acute myocardial infarction, none of them alone or in combination identify a group of patients that can be safely discharged without further diagnostic testing¹. Consider and evaluate further the cardiac causes if clinically indicated by age or cardiac risk status². Also it may be mentioned that since patients with costochondritis frequently present with acute chest pain, often resulting in multiple admissions and investigations ,an early rheumatological review significantly reduces admissions and investigations.

Costochondritis can also be classified into infectious, noninfectious and associated with other diseases such as seronegative arthropathies and other connective tissue syndromes.

Tietze's syndrome is also a closely related but distinct clinical entity and any discussion on costochondritis will be incomplete without its mention

PATHOPHYSIOLOGY

Costochondritis is an inflammatory process of the costochondral or costosternal joints that causes localized pain and tenderness. Any of the 7 costochondral junctions may be affected, and more than 1 site is affected in 90% of cases. The second to fifth costochondral junctions most commonly are involved.

PREVELANCE

The epidemiology of chest pain differs markedly

Correspondence to:**Dr. Anjum Ilahi**

Associate Professor of Medicine
Al-Nafees Medical College
Isra University, Islamabad Campus
Email: anjum_ilahi@yahoo.co.uk

between outpatient and emergency settings. Cardiovascular conditions such as myocardial infarction (MI), angina, pulmonary embolism (PE), and heart failure are found in more than 50 percent of patients presenting to the emergency department with chest pain³.

But the most common causes of chest pain seen in outpatient primary care are musculoskeletal conditions, gastrointestinal disease, stable coronary artery disease (CAD), panic disorder or other psychiatric conditions, and pulmonary disease. Unstable CAD rarely is the cause of chest pain in primary care, and around 15 percent of chest pain episodes never reach a definitive diagnosis.

The various causes of chest pain in an emergency room and their frequency as calculated by Miller et al⁴ is as follows:

- 1 Cardiac disease : 51.7 %
- 2 Pulmonary disease: 14. %
- 3 Gastro-intestinal disease: 2.4%
- 4 Musculoskeletal pathology: 7.1%
- 5 Somatization disorders: 9.2 %
- 6 Other 4.3%
- 7 Unknown 11.1%

The exact prevalence of costochondritis itself varies widely in different studies. In one ED study, 30% of patients with chest pain had costochondritis (5)

In children of course the costochondritis accounts for 10 to 30% of all chest pains.

CAUSES AND ETIOLOGY

Costochondritis does not have an associated known etiology, but is thought to be due to inflammatory conditions, trauma, or insidious onset. Limited reports of proposed mechanisms of injury include pull of surrounding musculature, repetitive arm adduction, and hypo mobility of posterior spinal structures⁶.

There are many illnesses that have costochondritis as their feature e.g. Fibromyalgia, psoriatic arthritis, ankylosing spondylitis, reactive arthritis, inflammatory bowel disease (ulcerative colitis and Crohn's disease)⁷.

USUAL HISTORY

The onset of costochondritis is often insidious. Chest wall pain with a history of repeated minor trauma or unaccustomed activity (e.g., painting, moving furniture) is common. There is sometimes also a history of upper respiratory tract infection. The pain of the costochondritis is sharp, nagging or pressure like usually on the front of the chest. Although mostly it is fairly localized but may extend or radiate to the back

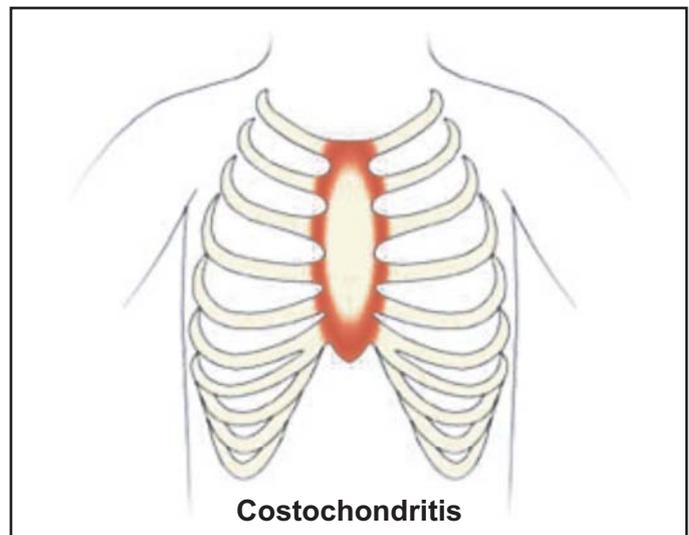
most commonly on the left side. It can be severe in intensity but may wax and wane. It is exacerbated by trunk movement, deep inspiration, and/ or exertion. However decreased movement, quiet breathing or even a change in position may reduce its intensity.

PHYSICAL EXAMINATION

Pain with palpation of affected costochondral joints is a constant finding in costochondritis. The reproducible tenderness you feel when you press on the rib joints (Costochondral junctions) is a constant feature of costochondritis without this tenderness costochondritis is unlikely.

The second through the fifth costochondral junctions typically are involved. More than 1 junction is involved in more than 90% of patients. Surprisingly, patients may not be aware of the chest wall tenderness until examination. Tietze's syndrome is characterized by nonsuppurative edema. Costochondritis has no palpable edema.

Examination of the lateral ribs, cervical and thoracic spine should be part of the comprehensive evaluation of costochondritis. Addressing posterior hypo mobility may lead to a quicker recovery in difficult cases⁶.



DIFFERENTIALS

- Abdominal Trauma, Blunt
- Acromioclavicular Injury
- Gout and Pseudo gout
- Anxiety
- Herpes Zoster
- Myocardial Infarction
- Neoplasm's, Lung
- Sternoclavicular Joint Injury

INVESTIGATIONS

Costochondritis is essentially a clinical diagnosis however a failure to respond to the therapeutic trial of NSAIDs or local injection or clinical findings that put the patient at high risk of an alternate diagnosis (e.g., history of fever, malignancy, history of trauma or injury, and localized swelling and erythema) should prompt further investigations as indicated by the possible differential diagnosis.

If an infective cause of costochondritis is suspected from history and risk factors, further testing with wound and/or blood cultures, white blood cell count, erythrocyte sedimentation rate, C-reactive protein level, blood and urine culture, plain radiography and CT of the chest, {or MR imaging}¹⁷ (99m) Tc bone scintigraphy, ultrasound-guided needle aspiration of soft tissue mass, Gram staining and culture of aspirated fluid or MR imaging should be performed¹⁹. Bone scan with technetium is not specific for costochondritis and may be positive in people without costochondritis. (12)(18). Many case studies suggest the value of gallium scan in the diagnosis of costochondritis^{13, 14, 15, 16}.

MANAGEMENT

The goal of therapy is to reduce inflammation. To accomplish this goal, nonsteroidal anti-inflammatory drugs (NSAIDs) are useful. NSAIDs are also useful for pain control. Other measures such as local heat can also be tried. Local infiltration of local anesthetic, steroid, (10) or intercostals nerve block (reserved for refractory cases) has been found to be of varying affectivity.

It must be mentioned however that the usual conservative treatment (NSAIDs), local splinting, local heat) are sometimes disappointing. The goal of therapy of costochondritis is to reduce inflammation and the pain. The NSAIDs, local injection of anesthetic or steroid has sometimes insufficient effectiveness. The possibility to improve the pain by means of simple stretching exercises can supply a useful instrument. Gentle stretching of the pectoral muscles 2-3 time daily can be tried in patients with persistent symptoms.

In addition interventions including postural exercises and manual therapies directed at the lateral and posterior rib structures to improve rib and thoracic spine mobility may be beneficial in order to treat the condition of these patients⁶. Other forms of manipulation and exercise prescriptions, may also be beneficial in the treatment of costochondritis.

The infectious variety of costochondritis which is almost always a consequence of open heart surgery responds well to IV antibiotics and surgical repair but recovery takes a long time.

There is also a long list of anecdotal and less well established forms of treatments just to mention a few:

1. Vit C.
2. Bromelain.
3. Primrose oil.
4. Glucosamine.
5. Ginger.
6. Acupuncture.
7. Chiropractics⁸
8. Massage.
9. Sulphasalazine⁹
10. Vit D²⁰

REFERENCES

- (1) Swap CJ, Nagurney JT .Value and limitations of chest pain history in the evaluation of patients with suspected acute coronary syndromes. JAMA. 2006; 17; 295(19):2250.
- (2) Sting Proulx AM, Zryd. Costochondritis: diagnosis and treatment. . Am Fam Physician TW.2009 15; 80(6):617-20.
- (3) Buntinx F, Knockaert D, Bruyninckx R, de Blaey N, Aerts M, Knottnerus JA, et al. Chest pain in general practice or in the hospital emergency department: is it the same? Fam Pract. 2001; 18:586-9.
- (4) Millar. Diagnosis of Chest Pain, JAMA, 1988;2 (4):1230-5.
- (5) Disla E, Rhim HR, Reddy A, Katen I, Taranta A. Costochondritis. A prospective analysis in an emergency department setting Archives of internal medicine Nov 14 1994 .154(21). 2466-9.
- (6) Grindstaff TL, Beazell JR, Saliba EN, Ingersoll CD. Treatment of a female collegiate rower with costochondritis: a case report. J Man Manip Ther 2005; 35(6):537-55.
- (7) Stockendahl MJ, Christensen HW Chest pain in focal musculoskeletal disorders Med Clin North Am. 2010;94(2):259-73.
- (8) Cross PS, Karges JR, Salsbery MA, Smith D, Stanley EJ .Management of acute sports injuries and medical conditions by physical therapists: assessment via case scenarios Int J Sports Phys Ther. 2011;6(3):158-72.
- (9) D. Freeston J, Can early diagnosis and management of Costochondritis reduce acute chest pain admissions? J Rheumatology. 2004;31(11):2269-71.
- (10) Gregory P, Musculoskeletal problems of the chest wall in athletes. Sports Med.2002;32(4):235-250.
- (11) Karen Hudes, BSc, BS, DC.Low-tech rehabilitation and management of a 64 year old

- male patient with acute idiopathic onset of costochondritis. *J Can Chiropr Assoc.* 2008; 52(4): 224–8.
- (12) Mendelson G. Can sup 99m technetium methylene diphosphonate bone scans objectively document Costochondritis? *Chest.* 1997;111(6):1600–2.
- (13) Ikehira H, Kinjo M, Nagase Y, Aoki T, Ito H. Acute pan-costochondritis demonstrated by gallium scintigraphy *Br J Radiol.* 1999; 72(854):210-11
- (14) Lee JK. Tc-99m MDP and Ga-67 citrate images in suppurative costochondritis. *Clin Nucl Med.* 2002 ;27(9):665.
- (15) Caruana V, Swayne LC. Gallium detection of Salmonella costochondritis. *J Nucl Med.* 1988; 29(12):2004-7.
- (16) Miller JH. Accumulation of gallium-67 in costochondritis *Clin Nucl Med.* 1980; 5(8): 362-3.
- (17) Honda N, Machida K, Mamiya T, Takahashi T, Takishima T, Hasegawa N, et al. Scintigraphic and CT findings of Tietze's syndrome: report of a case and review of the literature. *Clin Nucl Med.* 1989 ;14(8):606-9.
- (18) Wadhwa SS, Phan T, Terei O . Anterior chest wall pain in postpartum costochondritis. *Clin Nucl Med.* 1999;24(6):404-6.
- (19) Mohammad AF, Ambrose N, Hamnvik OP, Kearns G. Meticillin-sensitive Staphylococcus aureus costochondritis in a healthy man.) *Nat Rev Rheumatol.* 2009;5(12):708-10.
- (20) de Torrente de la, Jara G, P, Coud A, Favrat B. Musculoskeletal pain in female asylum seekers and hypovitaminosis D₃. *BMJ* 2004; 329:156-157