

Musculoskeletal Causes of Pediatric Chest Pain

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KEYWORDS

- Pediatric chest pain • Musculoskeletal causes
- Anterior chest wall • Costochondritis
- Precordial catch syndrome

OVERVIEW

Chest pain is one of the most common reasons for a child to urgently visit a pediatrician or the emergency department. Various disorders may cause chest pain in children and adolescents, including cardiac, gastrointestinal, respiratory, psychogenic, and idiopathic conditions. Overall, however, musculoskeletal causes are the most common of the identified causes of pediatric chest pain, accounting for 15%¹ to 31%² of cases brought to medical attention. Cardiac causes, which are of greatest concern to patients and families, are among the least common of the potential causes.¹⁻³

Although most cases of pediatric chest pain turn out to be benign, significant functional impairment may nonetheless occur in children with noncardiac discomfort.⁴ In 2 separate prospective studies, approximately 30% to 40% of children missed school as a result of chest pain.^{1,2} Perhaps of even greater concern is that, in one study, nearly 70% of adolescents with chest pain restricted their physical activities.^{1,2} Likely related to this finding is that noncardiac chest pain may be part of a broader picture of increased sensitivity to physiologic arousal.^{5,6} Lipsitz and colleagues⁷ found that nearly 60% of children with noncardiac chest pain met criteria for an anxiety disorder several years after their initial presentation.

In view of all of these factors, and given the significant medical, emotional, and societal burden of chest pain, it is important that physicians be well versed in the causes and treatment of pediatric chest pain. This article outlines the differential diagnosis of chest pain based on anatomic and functional considerations. Using this approach, caregivers should be able to convey appropriate reassurances to patients and families in a convincingly knowledgeable and confident manner.

The authors have nothing to disclose.

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Pediatr Clin N Am 57 (2010) 1385–1395

doi:10.1016/j.pcl.2010.09.011

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HISTORY AND PHYSICAL EXAMINATION

A focused musculoskeletal history and physical examination will often allow for the rapid determination of the cause of a child's chest pain. In the absence of an obvious explanation such as known trauma, it is helpful to start the evaluation by categorizing the type of pain or discomfort according to the nature of onset (acute vs chronic), and whether or not the chest is the only region involved. Thus, the examination should not be overly focused: a case of spondyloarthritis causing costochondritis and chest pain may only be evident after the examination also reveals Achilles tendinitis and sacroiliac tenderness. Most normally active children will have a history of trauma during the preceding 24 hours. However, unless the trauma is significant (typically a football injury, automobile accident, or bicycle fall), it is more likely to have unmasked preexisting pathology than it is to have caused a problem in the resilient tissues of a child's chest.

Key elements of the history that can help identify the cause of pain include (1) timing of the pain; (2) nature of the pain with regard to alleviating and exacerbating factors, particularly effects of activity; and (3) character of the pain, such as dull, sharp, radiating, or burning. In small or nonverbal children who are not able to articulate the specifics of their symptoms, observations made by the parents and other caregivers substitute for the patient's description.

Similarly, the physical examination is crucial in delineating the source of a child's chest pain. It is important to disrobe a child adequately to allow a complete examination, usually requiring the use of a hospital gown. The examination should begin with inspection, looking in particular for areas of right-left asymmetry. Active and passive motion of all parts of the chest, arms, and head allows for isolation of various anatomic structures and localization of the pain. Only then should the chest be palpated, because this is likely to be the most uncomfortable and frightening part of the examination for children. Palpation must be forceful enough to elicit at least some discomfort; overly gentle handling may not distinguish between normal and abnormal areas. Careful palpation will also allow for the identification of particular sites of bony discomfort or disruption, soft tissue injury, and neuropathic hypersensitivity.

Mechanical Derangement

Pain caused by injury or overuse typically increases with activity. Children typically feel well in the morning when they awaken. The more active they are, the more uncomfortable they become. Rest and ice tend to alleviate mechanical symptoms, rather than the activity and heat that are typically salubrious in arthritis. Because they are generally immobile while asleep, children are generally not awakened from sleep by mechanical pains.

Inflammatory Pain

Pain caused by arthritis and other chronic inflammatory disorders is typically improved, not worsened, by use; the mirror image of mechanical pain. The single most characteristic feature of discomfort related to inflammatory processes is the classic morning stiffness of arthritis. Difficulties are also often reported after naps or other periods of inactivity such as long car rides or sitting in classes at school (the so-called theater sign). However, children with arthritis typically feel better after a warm bath or several minutes of activity. Accordingly, a child with arthritis may suffer from joint stiffness in the morning, but may be comfortable exercising strenuously later in the day. It is atypical for inflammatory arthritis to awaken children from sleep. Cold, damp weather, or swimming in cool water tend to be more difficult for children with arthritis, whereas warm weather generally relieves symptoms.

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