Slipping Rib Syndrome

Jackie Dozier, BS
Edited by
Lisa E McMahon, MD FACS FAAP
David M Notrica, MD FACS FAAP

Case Presentation

- AA is a 12 year old female who presented with a 7 month history of right-sided chest/rib pain. She states that the pain was not preceded by trauma and she had never experienced pain like this before.
- She has been seen in the past by her pediatrician, chiropractor, and sports medicine physician for her pain.
- In May 2012, she was seen in the ER after having manipulations done on her ribs by a sports medicine physician. Pain at that time was constant throughout the day and kept her from sleeping. However, it was relieved with hydrocodone/acetaminophen in the ER.

Case Presentation

- Over the following months, the pain became progressively worse and then constant. She also developed shortness of breath. She is a swimmer and says she has had difficulty practicing due to the pain and SOB.
- AA was seen by a pediatric surgeon and scheduled for an interventional pain management service consult for a test injection. Following good temporary relief by local injection, she was scheduled costal cartilage removal to treat her pain.

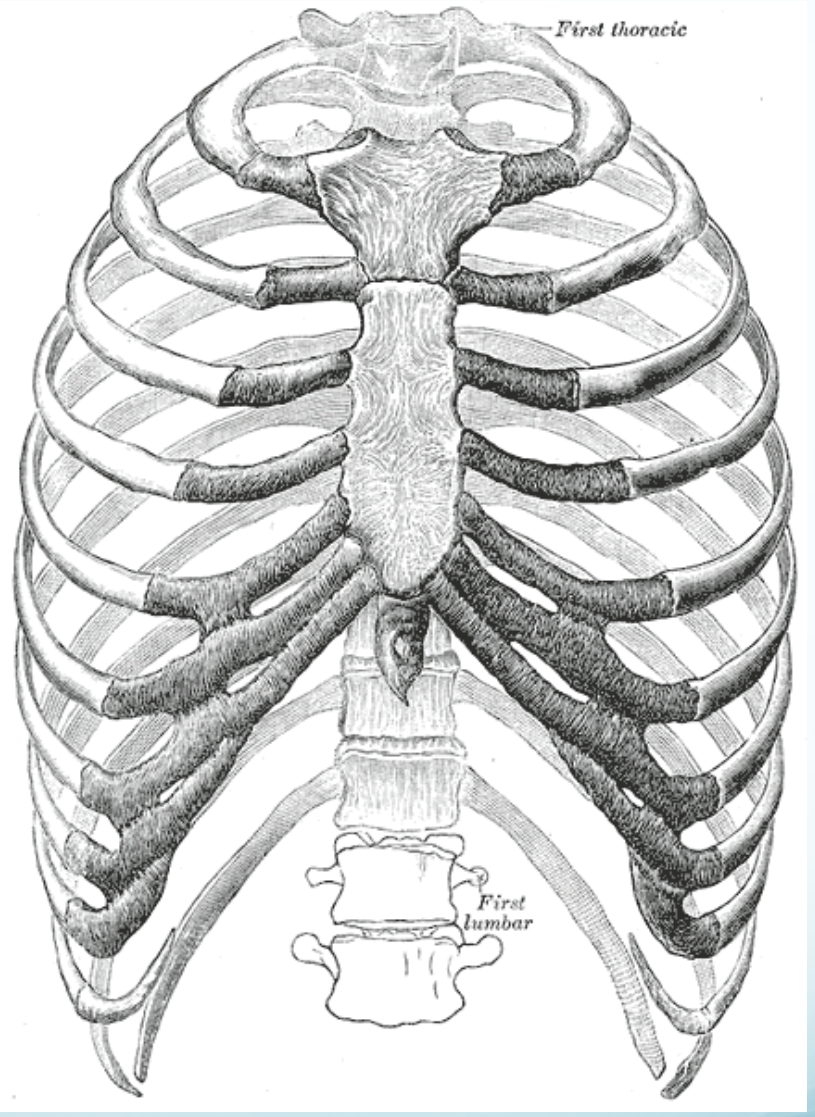
What is Slipping Rib Syndrome?

- Slipping Rib Syndrome (SRS) is caused by hypermobility of the anterior ends of the false rib costal cartilages, which leads to slipping of the affected rib under the superior adjacent rib.

- SRS an lead to irritation of the intercostal nerve or strain of the muscles surrounding the rib.

- SRS is often misdiagnosed and can lead to months or years of unresolved abdominal and/or thoracic pain.

- Important to recognize because surgery is the only definitive cure.



History

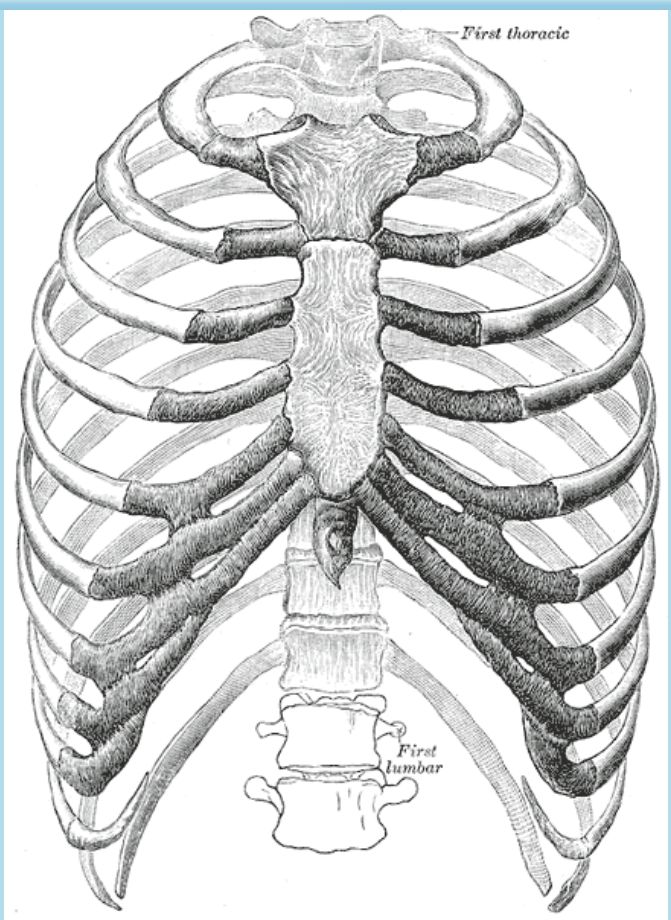
- First described in 1919 by E.F. Cyriax.
- Davies-Colley were the first to coin the term “slipping rib” and to describe successful treatment by excising the offending rib and costal cartilages in 1922.
- In 1985, Porter was the first to publish a report of this syndrome in children.

Epidemiology

- Female > Male
- Usually becomes symptomatic in children around age 12 and is seen in people all the way into 80's, with a mean of age 40.
- May be secondary to trauma, but this is not usually the case.
- 1/3 of patients will undergo further evaluation for other causes of pain, even after a definitive diagnosis is made.
- Has been referred to by a variety of other names, including lower rib pain syndrome, rib tip syndrome, and clicking rib.

Pathophysiology

- Ribs 8, 9, 10 (false ribs) most often affected b/c they are connected to each other via cartilaginous caps or fibrous bands instead of to the sternum. Therefore, these ribs tend to be the most mobile.
- Because one rib can rub against the other, patients may have intercostal nerve impingement that radiates to the posterior spinal nerve. This leads to the sharp pain often felt by patients. They may also experience abdominal and thoracic symptoms b/c it can radiate to the abdominal and thoracic sympathetic nerves.
- Ribs may sublux anteriorly with respirations and certain movements of the thorax and extremities, especially with certain activities. This often leads to the shortness of breath experienced by patients.



Signs and Symptoms

- Intermittent, sharp, stabbing pain followed by dull achy sensation for hours or days
- “Slipping”, “popping”, and “giving way” sensations are common
- Bending, stretching, lifting, deep breathing, and coughing can exacerbate the symptoms
- Signs and symptoms are usually unilateral
- May present as thoracic or abdominal pain

Physical Examination

- Palpation of the chest wall in the area of the pain may reveal tenderness, but it is not uncommon for little (if any) tenderness to be found. Palpation of the costal margin will often not elicit the type of pain the patient is complaining of.

- Hooking Maneuver: A reproduction of the pain event induced by the examiner curving his/her fingers under the costal margin and gently pulling superiorly and anteriorly, inducing subluxation of the offending cartilage.

Differential Diagnosis

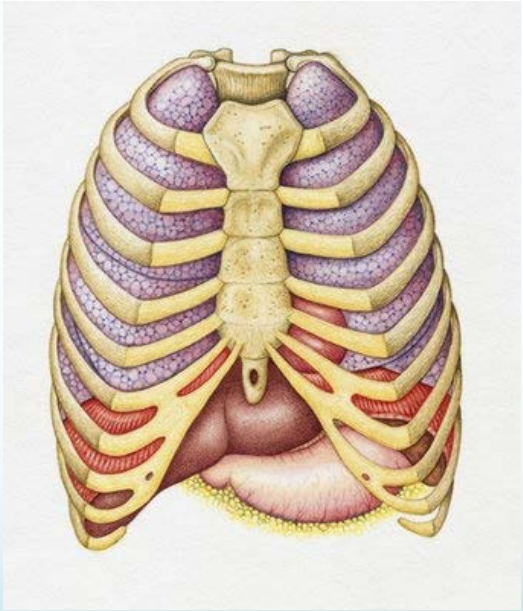
- Costochondritis
  - Multiple areas of tenderness that will reproduce the same pain
  - Upper costal cartilages, namely the costochondral and costosternal junction, tends to be where it most frequently occurs
  - No areas of localized swelling are detected on exam
  - Analgesics, local injections, and stretching may be helpful
- Tietze syndrome
  - A benign, painful, non-suppurative, localized swelling of the costosternal, sternoclavicular, or costochondral joints
  - Usually involves the area of the second and third rib, and typically do not see it involving multiple areas
  - Usually found in young adults
  - Cause is unknown
- Precordial Catch Syndrome (Texidor's twinge)
  - Brief episodes of sharp pain that can be localized to one interspace to the left sternal border or cardiac apex. Typically occurs at rest or with mild activity and is worse with inspiration.

Differential Diagnosis

- Sternalis syndrome
  - Localized tenderness over the body of the sternum or underlying sternalis muscle
  - Palpation often causes pain to radiate bilaterally
  - Usually self-limited, pain less likely to persist
- Xiphoidalgia
  - Localized tenderness and discomfort over the xiphoid process
  - Sx aggrevated by eating a heavy meal, bending and twisting movements, heavy lifting, and forceful coughing.
  - Analgesics and injection of local/steroid usually curative
- Spontaneous sternoclavicular subluxation
  - Spontaneous and atraumatic subluxation of the SC joint
  - Almost exclusively found in women age 40-60
  - Supportive, non-operative therapy recommended

Differential Diagnosis

- Because many patients with slipping rib syndrome will complain of pain in the upper abdominal quadrants, the epigastrium, or the chest, it is important to rule out other causes of abdominal and thoracic pain that could have a similar presentation. This extensive list includes (but is not limited to):
  - Cholecystitis
  - Esophagitis
  - Diffuse esophageal spasm
  - Gastric ulcer
  - Hepatosplenic abnormalities
  - Pleuritic chest pain
  - Bronchitis
  - Asthma
  - Myocarditis
  - Angina
  - Arrhythmia



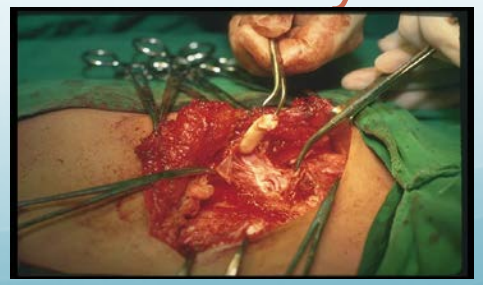
- Stress fractures, neoplasms, herpetic neuralgia, and sickle cell anemia are also examples of conditions that can lead to chest wall pain.

Definitive Diagnosis

- The definitive diagnosis of slipping rib syndrome is made by the clinical presentation.
- Laboratory and radiographic studies are of no value in diagnosing slipping rib syndrome, they will only help to rule out other disorders.
- The Hooking Maneuver can be helpful to distinguish between other causes of rib pain.

Treatment

- Conservative approach for mild cases:
  - Reassurance, ice packs, mild pain meds to relieve symptoms, core stability work, and temporary decrease in physical activities
- Injection of the intercostal nerve in the affected area with a corticosteroid can be done for intermittent and persistent cases.
- However, surgical excision of the subluxating cartilagenous rib tips is said to be the only known “cure” for this condition



Surgery

- Prior to surgery, ribs are counted down to the level of subluxation. A small incision is then made along the lateral chest wall at the appropriate level.
- Soft tissues are dissected down to the level of the external oblique muscle, which is then spread to expose the underlying costal cartilages. Attention should first be paid to the rib with the most subluxation.
- The sub-perichondrial plane is then created and the costal cartilage is bluntly dissected from its perichondrium down to the level of the bony attachments. Ribs above and below should also be evaluated and cartilage removed as needed.
- The removed costal cartilages are sent to pathology.
- Rib blocks can be performed with local anesthetic for pain control post surgery. As soon as adequate pain control is achieved, patient may be discharged home.

Surgery for H.L.

- 10th costal cartilage was the most lax and was dissected first. The 9th cartilage was also found to be somewhat lax and was removed next. The 8th cartilage was firmly in place. The 11th cartilage was found to be floating and was also removed.
- Rib block was then performed using Marcaine with epi.
- Pt did very well post-operatively and was admitted overnight for pain management. She was able to discharge home the next day on oral pain meds.

Summary

- Slipping rib syndrome is a cause of musculoskeletal pain along the costal margin in both young and elderly people alike. The most common ribs affected are 8-10 (false ribs).
- Patients often feel their rib “clicking” and “giving way” and often describe the pain as sharp, sometimes progressing to dull pain that lasts for long periods of time.
- Musculoskeletal rib pain has a broad differential and can be mistaken for a variety of other causes.
- Diagnosis is based off of the history and physical, with the Hooking Maneuver often used as a helpful test.
- Conservative management is available, but the only “cure” is surgical removal of costal cartilages.

References

- Geggel, Robert et al. Approach to Chest Pain in Children. Obtained from UpToDate, 11/14/12. http://0-www.uptodate.com.millennium.midwestern.edu:80/contents/approach-to-chest-pain-in-children?source=search_result&search=slipping+rib+syndrome&selectedTitle=2%7E7#H2859080

- Porter GE. 'Slipping Rib Syndrome: an infrequently recognized entitiy in children: a report of three cases and review of literature"Pediatrics [Pediatrics], ISSN: 0031-4005, 1985 Nov; Vol. 76 (5), pp. 810-3

- Saltzman DA, Schmitz ML, et al. "The Slipping Rib Syndrome in Children", Paediatric Anaesthesia [Paediatr Anaesth], ISSN: 1155-5645, 2001 Nov; Vol. 11 (6), pp. 740-3

- Taubman B, Vetter VL. "Slipping Rib Syndrome as a Cause of Chest Pain in Children", Clinical Pediatrics [Clin Pediatr (Phila)], ISSN: 0009-9228, 1996 Aug; Vol. 35 (8), pp. 403-5

- Udermann, Brian E., et al."Slipping Rib Syndrome in a Collegiate Swimmer: A Case Study", Journal of Athletic Training. Apr-Jun2005, Vol. 40 Issue 2, p120-122. 3p.

- Vincent FM. "Abdominal Pain and Slipping Rib Syndrome", Annals Of Internal Medicine [Ann Intern Med], ISSN: 0003-4819, 1978 Jan; Vol. 88 (1), pp. 129-30

- Wise, Christopher et al. Major Causes of Musculoskeletal Chest Pain. Obtained from