Case Report

Slipping rib syndrome presentation in a young woman

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ABSTRACT

Slipping rib syndrome (SRS) disorder is the hypermobility of the costal cartilages attached to the floating ribs. Causes include weakness of the interchondral ligaments, and less commonly congenital rib deformities or direct trauma. Due to its location (right upper quadrant) and symptomatic presentation, the differential for this syndrome is especially broad, and as a result, even though this syndrome may make up to 5% of visits for lower chest/upper abdominal pain, it is frequently underdiagnosed, and patients often undergo excessive workup. Treatment includes conservative management, physical therapy, intercostal nerve blocks and for refractory cases, surgical intervention. We describe a case of a 43-year-old female presenting with Slipping Rib Syndrome (SRS) that was confirmed with an ultrasound. In this case report, we discuss presentation of SRS, diagnostic maneuvers and image finding of SRS, and the treatment of SRS.

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Background

Slipping rib syndrome (SRS) disorder, first described by Cystax in 1919, is the hypermobility of the costal cartilages attached to the floating ribs [1]. Causes include weakness of the interchondral ligaments, and less commonly congenital rib deformities or direct trauma [1,2]. Due to this hypermobility, a lower costal cartilage may slide directly behind a more superior costal cartilage resulting in impingement of the intercostal nerve and causing vague pain [1]. SRS predominantly affects middle-aged females, adolescents, and in some cases athletes [2,3]. SRS may occur unilaterally or bilaterally, but the most typical presentation is on the right side [1].

Due to its location (right upper quadrant), typical demographic (middle-aged females), and symptomatic presentation, the differential for this syndrome is especially broad including chest wall etiologies (muscle strain, rib fracture, pleurisy) and upper abdominal etiologies (biliary disease, reflux, peptic ulcer, and nephrolithiasis). As a result, even though this syndrome may make up to 5% of visits for lower chest/upper abdominal pain, it is frequently underdiagnosed and patients often undergo excessive workup [1].
This case is of a woman with no significant past medical history who presented with refractory right lower rib pain despite aggressive workup and treatment, ultimately diagnosed with slipping rib syndrome on ultrasound.

**Case report**

A 43-year-old female with no significant past medical history presented to a cardiothoracic surgeon at our institution for further evaluation of persistent and refractory right lower rib pain that had been ongoing for three years. The patient lives and works on a farm and had first noticed right upper quadrant pain that was exacerbated during certain activities (heavy lifting).

Prior work up at an outside facility included a CT scan, HIDA scan, and transvaginal US, all of which were negative. Due to persistent pain, the patient also underwent a laparoscopic examination of the abdominal cavity to rule out endometriosis or other disease process that could explain her symptoms. This procedure was also negative. A persistent “popping” painful sensation to her right lower ribs, along with a “grinding” and “clicking” sensation resulted in numerous attempts in medically managing her symptoms, including over the counter medications, muscle relaxants, medical marijuana, and nerve blocks.

Finally, the patient was seen by a cardiothoracic surgeon at our institution and physical exam demonstrated tenderness to palpation of the right lower ribs which raised suspicion for slipping rib syndrome. A chest US was ordered with Valsalva to evaluate.

On ultrasound, imaging with dynamic maneuvers of the ribs showed the right 11th rib slipping under the 10th rib, which also recreated the patient's pain (Figs. 1A and B). This was not replicated on the left side. This confirmed right-sided SRS. Following discussion with the patient's cardiothoracic surgeon, the patient opted to proceed with surgical management to relieve her chronic pain. At that time the patient desired surgical correction. Unfortunately, since that time, the patient has been lost to follow-up.

**Discussion**

SRS is the sliding of a lower costal cartilage directly behind a more superior costal cartilage resulting in pain due to nerve impingement. There are several etiologies to explain this sliding; however, it is most commonly due to weakening of the interchondral ligaments. SRS predominantly affects middle-aged females and may occur unilaterally or bilaterally, however is mostly seen on the right. A common pathology, it frequently goes underdiagnosed leading to excessive and unnecessary testing [1,4].

SRS is a clinical diagnosis mainly aided by the ‘hooking maneuver’ on physical exam. More recently however, ultrasound with dynamic compression maneuver has been used as a confirmatory tool (to show the sliding of the ribs which recreates the patients pain symptoms) and to exclude other etiologies of pain (abscesses, muscle tears, etc.) [1,3].

Treatment of SRS is usually conservative management with reassurance and over-the-counter analgesic use. Ultrasound evaluation may provide further reassurance by showing and providing patient education on the cause of their symptoms. In cases of refractory pain, a stepwise approach is often taken utilizing physical therapy, intercostal nerve block, and finally surgical resection of the rib [2,4,5].

Fig. 1 – Neutral (A) and compression (B) images of the right 10th and 11th ribs. During neutral imaging, the right 10th and 11th ribs are similarly aligned, however the space between the ribs is narrowed. However, when compression is applied by pressing into the patient with the probe the 11th rib slides under the 10th rib. This dynamic compression maneuver recreated the patient's symptoms.
Conclusion

Despite its common prevalence, SRS is often overlooked. Persistent pain may increase in severity and decrease the quality of life of the affected patient. The 'hooking maneuver' on physical exam may indicate SRS, and ultrasound with dynamic compression maneuver can confirm this diagnosis. Treatment is often conservative with over-the-counter analgesics used as a first-line therapy. However, persistent pain may necessitate more aggressive management included physical therapy, intercostal nerve block, and in rare cases surgical resection of the rib.

Patient consent

Complete written informed consent was obtained from the patient for the publication of this study and accompanying images.

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