

Bilateral 11th rib disarticulation and resection for chronic rib pain: A case report



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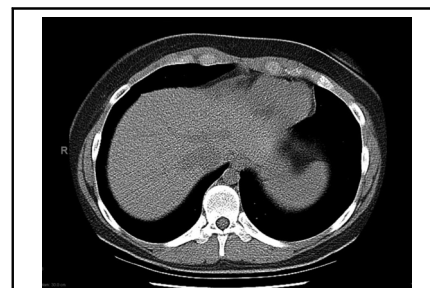
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Axial CT scan showing unremarkable insertion of the 11th rib on the vertebral body.

CENTRAL MESSAGE

We report the unusual case of unrelenting chronic pain at the bilateral 11th costovertebral joints that responded to disarticulation and partial rib resection of the affected ribs on each side.

Multitudinous causes, both traumatic and atraumatic, as well as the management of chronic rib pain have been discussed.¹⁻³ Painful rib syndrome and slipping rib syndrome are well-recognized entities resulting in chronic rib pain.³⁻⁵ Chronic pain related to the costovertebral joint, however, is less well understood and described. This report introduces the first documented case of bilateral costovertebral joint pain using partial rib resection as successful treatment for this obscure condition.

CLINICAL PRESENTATION

A 17-year-old female patient presented for surgical evaluation regarding chronic rib pain due to bilateral 11th rib “dislocation.” This diagnosis was made 1 year before the initial surgical consult. She underwent chiropractic manipulation to reduce the dislocation several times, with 5 days being the greatest length of time before another dislocation. Conservative treatments including trigger-point injections with local anesthetic and tramadol were not helpful.

Physical examination noted a slight paraspinal gap on the right side with a similar but less discernable gap located lower on the left. Her Zubrod/Eastern Cooperative Oncology Group score was a 1, and her pain score was a 7 of 10. Otherwise, the physical examination was unremarkable. Computed tomography (CT) of the chest was performed without contrast, which revealed no dislocations, fractures, or other intrathoracic abnormalities (Figure 1).

During the operation, a right-sided chest incision parallel to the rib was made, exposing the costovertebral joint of the 11th rib and vertebra. The 11th rib was completely disarticulated from the vertebrae and approximately one half of the rib was resected. The residual 11th rib was secured to the 10th rib with #2 absorbable suture after drilling the inferior rib to avoid disturbing the neurovascular bundle.

A 24-French straight chest tube was placed and secured. The surgical incision was closed in layers. Complications were not observed during the operation, and she was discharged home on postoperative day 1 after chest tube removal. At her 2-month postoperative follow-up, her chronic pain on the right side had completely resolved. However, with the improvement on the right-sided pain, her contralateral pain was becoming increasingly noticeable. The patient had not been taking pain medications due to their inability to relieve her pain.

The aforementioned operation was replicated on the patient’s left side without complications. This time, to reduce postoperative pain, no chest tube was left in place, and the patient’s chest incision was closed after having the anesthesiologist perform a Valsalva maneuver to expel the air from her thoracic cavity. In addition, in an attempt to mitigate postoperative pain, we elected not to drill the inferior rib nor place pericostal sutures. Estimated blood loss was 100 mL in the first operation and 20 mL in the second. Operative time was 57 minutes in the first operation and 59 minutes in the second. The patient reported having a significantly easier postoperative course after the second

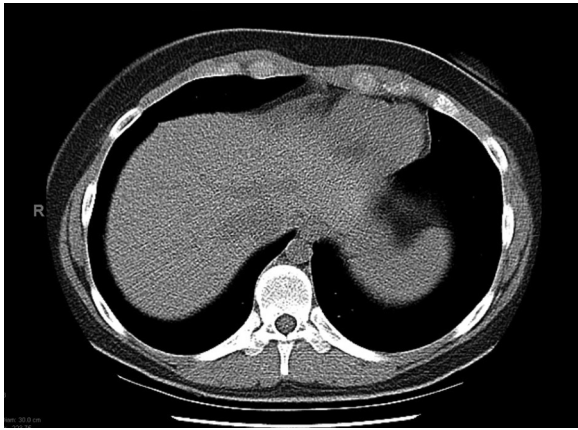


FIGURE 1. Axial computed tomography scan showing unremarkable insertion of the 11th rib on the vertebral body.

operation. Her chronic pain was completely resolved at her clinic visit 18 days after the operation.

The institutional review board (IRB) or equivalent ethics committee of the University of Alabama Medical College approved the study protocol and publication of data. (IRB approval number: IRB-030403013–Surgical Cases Database. IRB approval date: October 22, 2021.) The patient provided informed written consent for the publication of the study data.

DISCUSSION

Traditionally, chronic rib pain results from painful rib syndrome or slipping rib syndrome.^{3,4} Painful rib syndrome is considered to result from irritation to an adjacent intercostal nerve from ribcage hypermobility.³ Similarly, slipping rib syndrome is thought to result from a failure of development or fusion of the costal cartilage, allowing for grinding movement of the ribs/cartilage and impingement of the intercostal neurovascular bundle and peripheral soft tissue. The discomfort caused by slipping rib syndrome and painful rib syndrome tends to be located in the anterior thorax. In this case, however, the patient's discomfort was located posteriorly, in the paraspinal region at the 11th costovertebral joint. Removing approximately one half of the proximal 11th rib led to complete resolution of chronic pain.

We found only one published full-length manuscript describing this condition and treatment.⁶ Sales and colleagues⁶ reported a series of 5 patients treated with a similar operation between 1990 and 2002, which they termed resection arthroplasty. The diagnosis that the patients were given was osteoarthritis of the costovertebral joint. The patients underwent magnetic resonance imaging of the thoracic spine to exclude intervertebral disc pathology, as well as CT scan, which confirmed osteoarthritis of a single costovertebral joint. Image-guided injection of the relevant joint

with lidocaine and steroid was performed; a positive response to the injection was ensured before proceeding with resection in 4 of the 5 cases. Their mean operating time was 89 minutes (range, 72–118 minutes). Four patients were deemed to have a good or excellent result. Mean visual analog scale score with regards to pain was 7 preoperatively (range, 6–8) and 2 postoperatively (range, 0–4).

There were a few differences between the series from Sales and colleagues and our case report. First, our patient was much younger, at 17 years of age, compared with their patients' age range of 32 to 54 years. Second, our patient underwent bilateral rib resection, whereas their cases were unilateral. Third, CT scan demonstrated osteoarthritis of the costovertebral joint in the series from Sales and colleagues, whereas the CT scan of our patient did not show any visual abnormalities. Finally, both the partial rib and transverse process was removed in their case series, whereas only the rib was removed in our patient. Mean operating time was 58 minutes in our 2 operations, compared with 89 minutes (range, 72–118 minutes) in the series from Sales and colleagues. This was likely due to their more extensive exposure of the spine.

Unlike slipping rib syndrome, which is a fairly well-known phenomenon, chronic pain caused by mobility of the costovertebral joint has not been widely understood or reported. Resection of the rib leading to resolution of this problem has been only rarely reported. This case demonstrates this unusual case and successful surgical intervention. We do not believe that the patient's resolution of pain was related to dermatomal anesthesia caused by disruption of the intercostal nerve; previous local anesthetic injections in the area were not helpful, and the patient did not describe any significant numbness at either of the postoperative visits. Instead, we believe that her pain was alleviated by removing the contact point between the rib and the costal facet of the spine. Exact preoperative marking of the rib to be resected based on patient guidance is crucial, as intraoperative palpation or localization of the abnormal joint may not be possible. It is critical to completely disarticulate the head of the rib from the transverse process of the spine. Only partial resection of the rib is necessary, as the source of pain originates from the costovertebral joint, and not the rib itself. Minimizing additional tissue trauma (eg, omitting pericostal sutures and chest tube placement) may yield benefits in terms of postoperative pain.

References

1. Dahlhamer J, Lucas J, Zelaya C, Nahin R, Mackey S, DeBar L, et al. Prevalence of chronic pain and high-impact chronic pain among adults—United States, 2016. *MMWR Morb Mortal Wkly Rep.* 2018;67:1001–6. <https://doi.org/10.15585/mmwr.mm6736a2>

2. Kumar R, Ganghi R, Rana V, Bose M. The painful rib syndrome. *Indian J Anaesth.* 2013;57:311-3. <https://doi.org/10.4103/0019-5049.115585>
3. Scott EM, Scott BB. Painful rib syndrome—a review of 76 cases. *Gut.* 1993;34:1006-8. <https://doi.org/10.1136/gut.34.7.1006>
4. Foley Davelaar CM. A clinical review of slipping rib syndrome. *Curr Sports Med Rep.* 2021;20:164-8. <https://doi.org/10.1249/JSR.0000000000000821>
5. Mazzella A, Fournel L, Bobbio A, Janet-Vendroux A, Lococo F, Hamelin EC, et al. Costal cartilage resection for the treatment of slipping rib syndrome (Cyriax syndrome) in adults. *J Thorac Dis.* 2020;12:10-6. <https://doi.org/10.21037/jtd.2019.07.83>
6. Sales JR, Beals RK, Hart RA. Osteoarthritis of the costovertebral joints: the results of resection arthroplasty. *J Bone Joint Surg.* 2007;89:1336-9.